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ABSTRACT

Education, training, and employment are addressed in 33 papers from a 1984 conference of the Higher Education Research and Development Society of Australasia. Papers are grouped in the main categories of professional education and the influence of industry, course development for vocationalism, teachers and teaching, learners and learning, higher degree study of graduates, review and evaluation, and preparation for a post-industrial society. Paper titles and authors include: "Representation of the Professions in Curriculum Development" (A. P. Prosser)); "Enhancing Vocational Relevance through Co-operation between Sectors: A Country College Initiative" (E. Brooks); "Joint Industry and Educationist Development of a Tertiary-Level Course for Mid-Managers in the Mining Industry" (R. Francis, C. Burns); "Middle Level Technical Training by External Study: A Case Study" (P. Clark); "Staff Development and the Socialization of Incoming Academic Staff" (E. de Rome, D. Boud); "Evidences of Humanistic Education in Vocationally Oriented and Other Australian University Departments" (J. Genn); "Students' Understanding of Science Concepts" (E. Hegarty); "An Appropriate Curriculum for Part-Time Students" (R. Landbeck); "The Education, Training and Employment of Postgraduates" (P. Nightingale); "Evaluation and the Pursuit of Excellence" (I. Thomas); "What Are Superior University Teachers' Strengths in Teaching?" (I. Moses); and "A Model for a Comprehensive Approach to the Evaluation of Teaching Effectiveness" (R. Iredale). (SW)

RESEARCH AND DEVELOPMENT in HIGHER EDUCATION

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Volume 7

Selected papers presented at the tenth annual
conference of the Higher Education Research
and Development Society of Australasia
in Sydney, May 1984

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Edited by JACQUELINE LUBLIN

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HERDSA
higher education research & development society of australasia

RESEARCH AND DEVELOPMENT
in
HIGHER EDUCATION

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Selected papers presented at the
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• EMPLOYMENT •

Edited by
JACQUELINE LUBLIN
Centre for Teaching & Learning
THE UNIVERSITY OF SYDNEY

HIGHER EDUCATION RESEARCH AND DEVELOPMENT SOCIETY OF AUSTRALASIA

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HIGHER EDUCATION RESEARCH AND DEVELOPMENT
SOCIETY OF AUSTRALASIA

The general objective of the Society is to promote research and development in post-secondary education. Membership of the Society is open to any person interested in that objective.

Further information regarding membership of HERDSA is available from T.E.R.C., University of N.S.W., P.O. Box 1, Kensington, N.S.W. 2033, Australia.

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I would also like to thank the people who typed for us, Toni Benton and Alwyne Morgan.

Jacqueline Lublin
March, 1985

ABBREVIATIONS

ABC	Australian Broadcasting Corporation
ABEU	Australian Bank Employees Union
ACT	Australian Capital Territory
ACTU	Australian Council of Trade Unions
ANZAAS	Australia New Zealand Association for the Advancement of Science
BHP	Broken Hill Proprietary
CAE	College of Advanced Education
CCAE	Canberra College of Advanced Education
CSIRO	Commonwealth Scientific and Industrial Research Organization
CTEC	Commonwealth Tertiary Education Commission
IEA	Institution of Engineers Australia
RMIT	Royal Melbourne Institute of Technology
TAFE	Technical And Further Education
WAIT	Western Australian Institute of Technology

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CHAPTER 1

EDUCATION, TRAINING AND EMPLOYMENT: AN OVERVIEW

The 1984 Conference of the Higher Education Research and Development Society of Australasia took as its theme "Education, Training and Employment", and said:

> This year the conference will address the difficult but timely question of how the three tertiary sectors might most appropriately respond to an uncertain future in which the major restructuring of employment opportunities raises fundamental questions about the purposes of tertiary education.

The theme implied that the conference would look beyond tertiary education itself to the relationship between industry in the widest sense and the forms of educational preparation which claim to serve it. To this end we directed a great deal of effort in the pre-conference months towards inviting the participation of employers, professional societies and other interested parties, but with quite limited success, as the affiliations of the contributors to this volume will show. We did, however, attract a paper from a trade union, the Australian Bank Employees Union, and were privileged to have as guest speaker the general manager of Australian Iron and Steel Pty. Ltd., a subsidiary of BHP at Port Kembla.

While it is interesting to speculate on the reasons for the apparent indifference of others, nevertheless in this collection there is much to indicate that individuals and groups within educational institutions themselves are sensitive to the question of the relationship of education and training to employment, and are actively seeking ways of consulting and collaborating with industry. But there are also many indications here of the need for generalist education at all levels which will encourage that flexibility and ability to continue to learn which it is agreed must be the attributes of the educated person in the future.

Thus our conference attracted papers covering many aspects of the theme. This volume is not a Proceedings in the accepted sense that all papers that were given then are published here - it is instead a selection. Nor is it possible to claim that this selection contains only those papers directly related to the theme: in this country the HERDSA conference always attracts a diverse group of practitioners interested in different aspects of tertiary teaching and learning, and it would be untenable to have refused publication to many of the papers here on the grounds that they did not address the theme. So this is a collection that also reflects current interests in Australian tertiary education, and thus inevitably - and properly - reflects our ongoing pre-occupation with the design and review of courses, the evaluation and improvement of teaching, and the investigation of how students learn.

Nevertheless, some papers bear an overt relationship to the theme of the conference, and many have addressed the issues of curriculum design within the Australian context of the organization of tertiary education. Because of this, some of these papers inevitably reflect Australian preoccupations about control, funding, location and responsibility for the design and implementation of courses, and it may therefore be appropriate to describe briefly the roles and responsibilities of the three sectors of our tertiary education system, because all three are represented in this collection.

The oldest is the university sector. The 19 universities are incorporated by Act of Parliament, receive funding directly from the Commonwealth Government and are, at least in theory, entirely autonomous in their approach to course design, content and methods, even though many of their courses prepare for registration for professional practice. They offer Bachelor, Master and PhD level study, together with a range of post-graduate diplomas.

First or Bachelor degrees can range in length from three to five years' full time study.

The Advanced Education sector was created in the '60s in response to a perceived need for increased technological education. This sector's Colleges of Advanced Education (CAEs) are co-ordinated by state bodies which approve courses, including content, and distribute Commonwealth money. This sector includes CAEs which range in size and status from the large metropolitan Institutes of Technology to small single-purpose colleges. The PhD is not awarded in this sector, but many colleges offer PG1 and PG2 courses - Post Graduate diplomas and Masters degrees - while most offer either UG1 (degree taken over 3 or 4 years) or UG2 (diploma taken over 3 years) courses as a first qualification. It should be noted that many UG1 degree awards are identical with university first degrees in their provision of grounds for acceptance as preparation for professional practice. Engineering, law business studies/accountancy and teaching are examples of this. Many also offer the so-called UG3 qualification. This is an Associate Diploma taking the equivalent of two years of full-time study.

While this latter qualification must obviously be of use for para-professional credentialling, it has provided a bone of contention for the CAE and Technical and Further Education (TAFE) sectors. What is its appropriate level? Who should conduct it? Who should fund it? In status terms is it an embarrassment for the CAE sector to offer it? In terms of attracting clients - and thus money - can the sector afford not to offer it? Should it be left to TAFE?

TAFE emerged from the technical education division of the various State Education Departments. It is a state controlled sector, and is funded by the state for its operating and capital costs but also receives significant capital grants from the Commonwealth. Its traditionally accepted role is vocational training at levels which include training for the skilled trades and sub-professional technician occupations, as well as a wide range of special courses aimed at furthering the general education of adults.

Since 1977 all three sectors have come within the aegis of the Tertiary Education Commission, which advises the Commonwealth Government on funding for the three sectors. Accreditation of CAE awards has been conducted through the Australian Council for Academic Awards in Advanced Education which maintains national control of levels and nomenclature. There has been no national co-ordination of TAFE awards to date, but from 1985 the Australian Council on Tertiary Awards will oversee the control and nomenclature of awards for both the CAE and TAFE sectors at a national level.

No attempt has been made to group the papers in this collection according to sector of origin. That would have been both against the spirit of this Society, and counterproductive to an examination of the major issues which emerged in the conference. Two speeches are not reproduced here: Professor Peter Karmel, formerly Chairman of the (Commonwealth) Tertiary Education Commission and now Vice Chancellor of the Australian National University in Canberra, gave the keynote speech which opened the conference, and Robin Williams, the well-known science broadcaster for the ABC, gave a stimulating after-dinner address on a topic of his own choice. Professor Karmel's speech, Education and training for work and living, advocated changes in school curricula, the replacement of the apprenticeship system by a system of traineeship, and the re-allocation of educational resources to encourage post-school educational participation rather than the amelioration of the present school environment. It is published in the Australian Journal of Education, 28, 2, August 1984.

It is appropriate that John Clarke's guest speech Education and training for the workplace should begin this collection. In it he addresses many of the most important issues with wisdom and humanity from an employer's point of view. Some of his asides challenge received wisdom, like "the idea that CAEs produce the more practically oriented graduates is not our experience", and his message to us is clearly in the tradition of genuine education - that our programs for people who will be his employees need to emphasize broad education rather than specialist education to help them cope with the rate of technological change, that graduates lack interpersonal and team work skills, that apprenticeship training needs less purely didactic forms of teaching, and that all students need to cultivate their verbal skills. As a manager of a steelworks his care for people comes through clearly - we do not often have the opportunity of hearing such a frank and interesting account from the other side, as it were.

Members from the three tertiary sectors were invited to join a panel to discuss the topic: Tertiary education's responses to the future needs of society, in itself an unwieldy title but one which generated incisive and provocative speeches by the panellists, who are arranged here in alphabetical order of names. Professor Dick Collins has held the Chair in Applied Physics at the University of Sydney for six years. He came to academia after 15 years as a research physicist in the private sector. His paper is a cogent and forceful reiteration of the importance to society of applied research and of the need for universities to consider the relevance of their research work to the needs of society. He argues that ultimately academic freedom depends on the development of a stronger relationship between industry and academic researchers.

Dr. Don Watts is the Director of the Western Australian Institute of Technology, one of the largest CAEs in Australia. His challenge is essentially to the bureaucratic structures in tertiary education; he believes that

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there are differences in emphasis only between universities and CAEs, not differences in kind - and in saying so he provocatively strikes at some of the cherished and unexamined assumptions which underlie the present tertiary education system in Australia. He asserts that the present tertiary system is inadequate to the future needs of Australia, and he believes that society will be best served in the future when the distinctions between CAEs and universities are abolished and as individual institutions they are allowed to do best what they are best at doing.

John White is the Deputy Director General of the Department of Technical and Further Education (TAFE) of New South Wales. In his paper he expresses confidence that TAFE will be able to respond to future social needs because it is a flexible system and can thus respond to the increasing need for inter-disciplinary training, it is physically decentralized and thus near the workplace, and it operates at a variety of levels and offers a variety of awards. He sees problems in credentialism which can lead to a blurring of the boundary between technician and professional programs, and in the need to keep the training environment in step with technological change. He believes that co-operation between all sectors is necessary in order to provide society with quality and diversity of educational opportunity.

Issues canvassed in the papers in this chapter recur in subsequent chapters. In particular, important general issues related to the theme of this conference which continue to echo in this collection are the concern that undergraduate professional education should not become too specialist, the need for interpersonal skills to be given more importance at all levels of training and education, the need for generalist training to be geared to opportunities for retraining, and the need for a creative entrepreneurial and co-operating approach with industry in designing courses.

It remains to be said that this introduction will not attempt a consumate definition of the difference between education and training - the way in which these words are used in this collection rests within the context created by each individual contributor. Nor was this conference able to broach in any broad sense the grievous question of youth unemployment in Australia - we confined ourselves to looking at what we do within a tertiary educational institution in preparing students to enter the world of work. I believe there is much in this collection of interest to those who teach, those who design courses, those who employ and those who administer.

EDUCATION AND TRAINING FOR THE WORKPLACE

John Clark,
General Manager,
Australian Iron and Steel Pty. Ltd.,
Port Kembla

Today BHP employs 55,000 people, in operations managed by the Group. Of these 7,000 are tradesmen, 2,000 have a para-professional qualification and 2,200 have degrees. There are currently under training 3,400 apprentices, 560 certificate trainees and 760 degree trainees. So BHP does have a vested interest in the output of Universities, CAE's and TAFE.

I approach my task today with some trepidation, noting the calibre of the two other guest speakers preceding me, Robyn Williams and Professor Karmel, and also because I have some involvement with the University of Wollongong where I am constantly put to shame and ridicule by the academics there for my sweeping generalisations and unsubstantiated statements. I think there will be time for some discussion at the end, so if I say anything that makes you shudder, please say so - my skin has been toughened.

I should first give you a brief picture of the Steelworks at Port Kembla so you know the context in which I am talking. The Steelworks is both capital intensive and labour intensive with some very high technology and some very basic operations. I shall mention just a few things that might mean something to some. We have equipment like a scanning electron microscope, a transmission electron microscope, computer controlled metallurgical test machines, spectrometers, and so on. We are at the forefront of the new steel development for things like off-shore oil rigs. For the computer minded, we have two 3081's linked with a network of micro and mini computers. There are 66 personal computers on the plant and more every month and many operations have analogue computers. We have a highly sophisticated direct standard costing system; our cost evaluation techniques are up with anyone's and our current cost accounting is too advanced for most. We have some machine tools unique in Australia. Of our personnel practices we are less proud, but we do have an organisation development programme embracing Interaction Management and Total Quality Control, etc.

On the other hand, we employ 6,500 semi and unskilled people in a workforce of 13,000, many in hard hot manual jobs, and our industrial relations, while not as bad as many think, leaves a lot to be desired. Just to complete the picture, the plant is organised in 11 major departments - 4 operation departments, engineering, finance, computer systems, technical services, production planning, personnel and organisation development. We employ professionals and para-professionals from most of the technical disciplines - chemistry, physics, metallurgy, computer science, most branches of engineering, commerce, medicine, law, psychology, and in a great number of the trades.

The skilled or qualified people at the Steelworks at Port Kembla, i.e. the product of the universities, CAE's and TAFE, are in two main categories - specialists in their own field who work largely as individuals, and generalists who are applying and organising the technology and are interfacing with other technologies and people.

The three types of qualified people, graduates/certificate holders/tradesmen, are found in each of these two categories. So there are specialist graduates and generalist graduates, e.g., managers, and there are specialist tradesmen and generalist tradesmen, e.g. foremen.

So let me talk about each of the three types of people and how we at Port Kembla see their educational needs as specialists or as generalists, both from our viewpoint and from theirs. Of course you cannot put people or the work they do into watertight boxes. It is an over-simplication, but helpful for the purposes of this discussion.

Starting with graduates - these are the people from universities and CAE's with undergraduate or higher degrees. I make no distinction between university and CAE graduates. We see little difference, and the idea that CAE's produce the more practically oriented graduates is not our experience.

As far as the specialists go, we are, in general, very happy with the calibre and training of the people we get. Perhaps this is because we don't need many, so we can be selective. Maybe less than 10% fall into this category, i.e. high calibre specialists working at their own speciality, largely on their own, e.g. on engineering design problems, in fundamental process control. This work is very much an extension of their academic work and fits nicely into one of the roles of the university, i.e. the creation and advancement of knowledge, provided of course we don't bog them down with organisational matters, and give them freedom to act. (And I think by and large we do this.) Technology is changing so rapidly that they are being continually challenged and this is what they like.

The situation with the generalist is different. Because of the increasing complexity of our operations, a number, often a large number, of technologies have to be integrated together. In a very small business, one person can be an expert in everything - finance, personnel, operations. But in something as complex as the steel industry this is of course quite impossible. So "generalist" is really a wrong term. They are specialists who have to integrate their speciality with other specialities. They have to be part of a team, and this is where I hear the constant complaint: that graduates, by and large, are not initially good team members. They have not been taught or have otherwise learnt the interpersonal skills, the human relations, the politics of working with other people, to get a result which represents the necessary input of their expertise integrated with that of others.

We have at the moment several major projects for rebuilding or installing new equipment. Each project may involve inputs from commercial, metallurgical, computer, personnel and engineering, and often these inputs clash and compromises have to be made. Certainly the project leader has to co-ordinate it all, but the best result is when individuals make their own contribution but have sufficient understanding of the other contributions and of the techniques of teamwork to see how it will fit together. I think the result is called synergy.

I suppose you are saying that what we are looking for is the universal man or woman, and how can you in three of four years give all this - expert in one field, a working knowledge of all others, and skills in human relations. And I suppose we are - that is the dilemma.

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But I think some changes or just changes of emphasis can be made to courses that would go a long way to producing a graduate better able to fit our needs. Unquestionably the graduate should reach the highest possible academic standard in his or her discipline. But perhaps in not such a wide field. Perhaps a commerce graduate doesn't have to be highly trained in accounting and commercial law or a mechanical engineer in machine design and thermodynamics. I'm on dangerous ground here and maybe they are bad examples, but a little less specialisation and a little more broadening in other fields can be done. I think there is room for engineers to do some accounting and industrial relations. Almost every graduate in an organisation needs to be able to programme a personal computer. If further specialisation is required, postgraduate diploma courses can be the answer.

I understand there are lots of things taking place that are broadening courses. Many courses are giving their students an exposure to the organisations they may join by providing guest lecturers from industry to present case studies or to lecture on specific topics. A number of CAE's are introducing sandwich courses. We at the Steelworks have been a supporter of part-time courses, but there are pluses and minuses here. Universities and CAE's are approaching industry to provide practical problems for projects and theses. Sabbatical leave in industry seems a good idea. And I think some of he new techniques for team learning would certainly be beneficial both as a medium for teaching the particular topic and also for developing teamwork skills.

Before leaving the graduate field, I should say something about the graduates themselves. No matter how they have been trained, they still face dilemmas when joining a big organisation, and unquestionably the organisation has a big responsibility to help them. They have been working for themselves, now they work for an organisation. They have been working with intellectual peers or superiors. Now, unless they are specialists, they will often be working with inferiors, and certainly in the steel industry there are some pretty thick people they have to work with and through. I found a quote from somewhere: "The human problem is unworthy of their efforts". They may find they have much more scope in the sense that, if they are building something, they've got everything they need, as opposed to the bits and pieces they have had to make do with in their university laboratory or workshop, or they have some staff at their command. But on the other hand, everything they do is directed to a word they may well consider dirty, "profit", and for the benefit of the organisation, not themselves.

We have to recognise these problems and changes, and help them fit into a new environment without killing the idealism and individuality and stifling the high work output they have achieved for themselves.

We are getting better at this, if only because having pruned our workforce drastically, we cannot afford to have anyone not fully utilising their potential. The old manager who used to say "throw your books away sonny, here we do it this way" is going. He is desperate for people who are up to date with the rapidly changing environment that he can't keep pace with, and even we old hands are learning some human relations skills. But it's hard to avoid some indoctrination for the new graduates which can be frustrating for them.

Another thing we have to consider with all trained people is that the rate of change of technology is likely to make that training obsolete within their lifetime. I think this is perhaps less of a problem than for para-professionals and tradesmen, but it is still very real. Universities and CAE's provide postgraduate courses which keep people up-to-date, and this seems to be the answer. A related and more serious problem is the poor market forecasting for graduates, both by employers and by educational institutions.

Our BHP overall intake of graduates and trainees was:

	1979	1980	1981	1982	1983
Graduates	211	242	207	10	52
Trainees	158	261	334	235	86

On the other hand, as I understand it, tertiary courses are funded according to the number of students in individual courses, and the number of students in courses is largely determined by the number of places. In technical courses e.g. in engineering, this leads to wild swings in the number of graduates. In 1980 there were 80 chemical engineers graduating in Australia. The demand for chemical engineers was at a peak and publicity about the shortage has resulted in an expected graduation from chemical engineering in 1985 of over 400, many of whom will be unlikely to find a job in their profession. It is cruel when someone sets out on a course with high prospects and finishes up having to drive a taxi.

So much for the graduate. I will turn to the para-professional or certificate holder who, in our case, does a four year part-time course at the TAFE. This person is becoming an increasingly important member of the steelworks organisation. On the one hand, we increasingly need a more skilled person than an apprentice-trained tradesman to assemble, operate and maintain the complex equipment we use, particularly in the electrical area. We indenture all our engineering certificate trainees so that they acquire the necessary trade skills and have union acceptance.

On the other hand, we find that the organising and managerial skills required to manage an increasingly technically oriented but still large workforce requires the calibre and training of a certificate holder. All our certificate trainees are from HSC, even though the TAFE requires only School Certificate. So we get pretty bright people, who have perhaps had enough of intensive education but have lots of initiative, and still want to better themselves but also want some action. Much of the steelworks runs on a 24 hour 7 day-a-week basis, and our certificate person is ideal to run a plant on weekends and at night, when the basic plans have been made, but there are still plenty of crises to be solved and short term planning to be done.

The para-professional, from our viewpoint, definitely needs more organisation and supervisory training. Some of the engineering technicians are specialists but the great majority of our certificate chemists, metallurgists and commerce people quickly move into organising and supervisory roles. If it was a choice between less specialist training and more broad training, we would opt for the latter.

Your speaker yesterday, Professor Karmel, said a couple of years ago: "TAFE should resist narrow skills training which is highly specific to particular jobs", and suggests that "communication and the nature of social and human relationships are areas that should be considered by TAFE".

Another reason for less specialisation is that there are signs that there will be even less demand for their specialist skills in the future. Already our 300 strong Computer Department employs very few para-professionals, on the basis that the computer development requires degree-calibre people, and the rest is so simple that even a General Manager is supposed to be able to programme his mini computer. The shift computer operators and programmers in the central computing area are graduates passing through. Similarly, in the electrical and electronic field, while we have some very complex work being done today, increasingly much of the complex equipment is in the form of modules that can be sent away to the manufacturer for maintenance rather than this occurring on site.

Apprentice training has some particular problems. The tradesman is as vulnerable as anyone else to changing technology, probably more, because he is less adaptable. This was brought home to us at Port Kembla recently when we had to reduce our workforce. Because of the "last on-first off" principle, we lost most of our younger recently trained tradesmen, and we found we just didn't have the skills and understanding amongst our older employees to service some of the more modern equipment. If retrenchments had not been on seniority, we would have preferred the older, more experienced but less up-to-date people to go and they would have found it far harder to get another job, which is of course one of the reasons why the unions have their policy. But had we closed down completely, as some plants or operations in other industries have, then the older ones would have gone also, and would have been in great difficulty finding another job.

But it is not easy to interest an apprentice or tradesman in looking ahead and educating himself or herself for the future. One of the reasons why they choose apprenticeships rather than press on with their schooling is they are not particularly interested in further study. I suppose one could try and anticipate the skills needed 10 years ahead, but this is pretty difficult - who knows what will happen in 10 years time?

And of course employers want an immediate return from their apprentices when they qualify. while the cost of training of graduates and, to a large extent, certificate people, is born by the community generally, there is a direct charge to the employer for training an apprentice. We estimate the cost to be $49,000 per apprentice. Multi-skilling would help and we are working on the unions to allow more of this not only to help the tradesmen but to help ourselves, and I think you should be doing the same with the unions.

As far as I know there are no TAFE programmes for upgrading or retraining a tradesman's skills. It is up to the employer, and we do some of this, or they have to uprate their own skills to meet the developing technology of their particular trade - something, as I've said, they are often reluctant to do.

To help to be more adaptable, we would suggest that there is scope to move away from the "teacher-tell" to the enquiry style of teaching like the team learning I mentioned earlier. In fact, one system we have ha great success with in training our unqualified people is by "instrumented team learning".

Another expectation we could see in apprentice training is some leadership training. In the past, most of our trades foremen have come from trademen but increasingly certificate holders are being used as foremen, and I fear that some of the excellent leadership material that is amongst our tradesmen may be squeezed out. Again, you have to ask the question "What's the point of giving leadership training to 16 year olds when they're not going to apply it for maybe 10 or 15 years?" And that is of course a very fair comment. But properly done, I think it can rub off and if they have any ability to think and compare, they will be reminded of their training by comparing what they have learnt about leadership with the way they are being led.

Once again, I'm sure some of you are asking how we are going to teach immediately needed skills, techniques for the future, and management in one day a week to people who are a lot more interested in other things anyway. Certainly this is the dilemma but it's got to be wrestled with because it's all needed.

Finally, I would like to make one special plea. Irrespective of anything else, please, if you possibly can, instill verbal skills, oral and written, into your students.

I know this is an old chestnut, but it really is just so important. As I hope I have made clear, most of what we are about at the Steelworks is working with people, and you can't work with people if you can't communicate, and truly (and this is a considered and researched statement) the majority of people when they graduate cannot communicate their expertise adequately. And apart from anything else, it's one of the ways of getting on. I get a stack of memos, reports, letters and submissions and so on to read. If I get one that is easy to read, I certainly note who the author is. Similarly, if I am talking to a young person on the plant or in a laboratory who speaks clearly and concisely, I remember who that person is.

At the risk of sounding pompous, let me relate my own experience. When I completed my engineering at Melbourne University, I did English I at night, for fun. And I got a tutor who decided he would take up the challenge of teaching this illiterate engineer to write. It was the hardest subject I every did. Back again and again came the essays to be rewritten. The cheek of the man to treat a graduate, of what was undoubtedly the toughest faculty in the University, in this way! But it has served me in good stead. It's obvious I didn't have the same pressure to develop oral skills. I wish I had. I think here we accept an even lower standard. I think students should reach at least the same standards of writing and speaking as are required in other aspects of the discipline they are studying.

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TERTIARY EDUCATION'S RESPONSES TO THE FUTURE NEEDS OF SOCIETY

Professor R.E. Collins,
Department of Applied Physics,
University of Sydney

At present there is much debate both inside and outside tertiary institutions about the relative merits or otherwise of so-called "useful" work. Should tertiary education research and teaching be related to the outside needs both of the community in which they exist, of the nation, and of the world? To what extent is this occurring? What are the merits of influencing academics, either directly or indirectly to address such needs?

The background to this discussion is one of many years of unconcern within the tertiary education institutes, particularly universities, towards the relevance of their research work to society's needs. I cannot say whether this unconcern is deliberate or whether it comes about simply because of a lack of understanding of the way in which research advances benefit society. There has certainly been a belief particularly among senior academics and scientists that good research by itself will result in economic benefits to society - that somehow the research advances will automatically be picked up by industry and flow through to commercial products, making our industry more competitive and justifying the funding for the research. That this has not happened is now common knowledge and widely recognised in all sectors of Australian society. Australia has an excellent record of achievement in fundamental research and an appalling record of translating those research advances into practical benefits to the community.

This concern for fundamental research manifests itself in many ways in the nature of Australian scientific work and the structure of the Australian scientific community. For example, there has been and possibly still is a very strong belief among many scientists and academics that pure fundamental research is the highest form of academic endeavour. Many academics believe that to relate this work to practical applications is to degrade its quality in some way - to make it second-rate. I would argue strongly with this view and indeed can present a very strong case that applied research is, in many ways, more difficult than fundamental research because of the extra constraints relating to such work - constraints of time, money, the need to solve a specific problem, the public consequences of failure to acheive previously specified aims.

This obsession with fundamental research also shows itself up in the promotion policies of scientific organisations such as the universities and CSIRO. Promotion has been given specifically on the basis of the well-recognised but perhaps invalid academic criterion - the number of publications in well-refereed journals. Unpublished work specifically related to practical problems has, in general, been discounted as has a good record in invention and patenting.

Academic researchers have been very reluctant to work on industry problems. The traditional attitude of academics to industry is that there was nothing worthy of consideration in industry and no one with whom a meaningful interaction could take place. This conclusion was drawn in splendid isolation from industry, being made with little appreciation for the needs of industry and for the capability of industrial personnel to interact.

There has been negligible job mobility between industry and the academic sectors and very few joint appointments to positions in academic organisations and industry.

The inability of our research effort to make significant practical contributions to national well-being has led to a disenchantment with the universities in particular by politicians and the community. At a recent ANZAAS public awareness forum in Adelaide the Minister for Science and Technology, Mr. Barry Jones, referred to the academics' "appalling" inability to communicate effectively with the rest of society. In a recent graduation address to the University of Newcastle the Minister for Education and Youth Affairs, Senator Susan Ryan, argued that there was a very strong case for university research being more closely aligned and more responsible to national priorities. She referred to recent reports by OECD examiners stating that Australian universities needed to improve their research capacity "having regard to national priorities".

There are I believe many positive signs on the horizon. My own appointment to the University of Sydney for example is an illustration that that organisation is prepared to undertake work of relevance to industry and that it gives it its due credit within the criteria of academic acceptability. I have sat on promotion committees at the University where people have been appointed to Associate Professor level with very few academic publications but with a record of achievement and many unpublished reports in areas of industry relevance. Recently our Senate resolved to recognise the importance of innovation in the University's activities and to move towards encouraging such work in the university.

Outside the universities I see many Colleges of Advanced Education, particularly the Western Australian Institute of Technology and the Royal Melbourne Institute of Technology who are extremely successful in interacting with industry. These organisations are an object example of how it is possible to do good academic research and at the same time be relevant to industry and community needs.

The future of our society has many difficulties, some of which are clear for all to see. We have to learn to cope with many complex problems which come out of new technological developments, with the capacity to produce far more than we need, with the great imbalance between our well-being and the poverty of people in other countries. The successful resolution of these problems will require concerted effort. The welfare of our society depends on the extent to which we can all work together to achieve agreed goals. Academic institutions must play their role in this process, both through education and research. I believe that the **laissez faire** approach by academic institutions to the rest of society so evident in the past has no place in the future.

Increased relevance and increased interaction between academics and society does not imply a drop in academic standards as I have argued earlier. In addition, I do not wish to argue that all research should be applied. We have a moral and intellectual commitment to continue to contribute to the store of knowledge which is ever-growing throughout the world. Many of our applied research programmes can contain a strong component to fundamental research. Indeed, most of the applied research that I have done in the past has been of this nature. In addition, some of our research should be curiosity motivated. The freedom for academics to pursue their own interests, to an extent, is something which should be guarded at all costs.

If academic institutions do not devote a substantial proportion of their resources to specific needs of society, and are not seen to be doing this, then I believe that someone will come along and make us do it. It is my assessment that the politicians and the rest of society have woken up to the fact that the approach towards research followed so blindly and naively in the past is incorrect and not relevant in this day and age. There is a compromise position involving a healthy component of fundamental, curiosity motivated research and a strong effort in applied research. They can and do operate side-by-side, complementing one another. They both have strong academic challenge and it is possible to achieve excellence in both areas. By far the best way of becoming involved in such work is to choose to do it ourselves. I am talking about the survival of academic freedom. If we as academics do not exercise our academic freedoms responsibly it is possible that we will not keep them and I would argue that we do not deserve to keep them.

Dr. Don Watts,
Director,
Western Australian Institute of Technology

Firstly, let me thank the Higher Education Research and Development Society of Australasia for the kind invitation to participate in this panel discussion. My pleasure stems from my respect for the work of HERDSA and for the opportunity this type of gathering gives one to float some ideas, which are hopefully thought provoking, without the need to present exhaustive arguments.

I shall deal but briefly with the TAFE sector on the grounds of my confessed ignorance. I certainly have very great misgivings about the direction in which TAFE is moving in its period of relative affluence. I see higher institutionalised development, big buildings, new equipment and increasing momentum. I ask about the quality of service. I question whether such a wide variety of programmes is a justified use of the taxpayers' dollar. In particular I ask, in our world of cyclical political appeal, about the future service when the capital structure must be maintained, when the equipment is obsolete and when industry asks, as it must do - can we afford to capitalise the work place with the necessary modern internationally competitive equipment, and pay taxes to duplicate this equipment in training institutions? It is my view that the TAFE sector is in danger of building capital structures beyond its capacity to maintain in the future. It should be reaching out more from places of more modest investment to help industry train on its own equipment at the trainee's place of work or by agreement between companies in neighbouring plants.

The universities and the institutes of technology know the problem of equipment obsolescence, of buildings depreciating through inadequate maintenance, when these priorities fall below the pressing needs of the recurrent costs of providing sufficient numbers of adequately qualified staff.

With my knowledge of these problems in the university and college sectors and my intuitive feeling about trades and skills training, I would be looking to establish a commitment to top quality staff, respected by industry, who would be welcomed into the workplace to train and to innovate in offering their special knowledge to the supervising staff of the company in a consulting role.

In my view the TAFE sector is out of place under the CTEC umbrella. Its role and philosophy do not and should not have much in common with institutions within the other two sectors. There are also differences in the way the sectors are funded in that, unlike the universities and colleges, TAFE funds come jointly from State and Commonwealth Governments. The shared umbrella of CTEC is simply an encouragement to TAFE to emulate the solutions and the mistakes of the other two sectors. This encouragement acts on both the unimaginative bureaucracy and the institutions themselves.

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So much for my opinions on TAFE, conscientiously developed in sheltered ignorance.

Thirty years firstly as a student and then as a staff member in universities and four and a half years in the management of a major college of advanced education tell me that the responsibilities and functions of these two types of institution are the same, that is, in teaching, research and development, and professional community service. The differences are ones of balance and degree and manifest as much in the differences between institutions within the sectors as they do between the sectors. There are pedantic arguments which can waste the time of academics in both types of institution about the differences in the nature, philosophy, scale, role and purpose of the research and development, but in the end it must be admitted that in principle my thesis is correct. If it is not true then it must have been the country's purpose to establish places like the Western Australian Institute of Technology (WAIT) as second-class institutions to serve as instruments for the maintenance of privilege for those families in our community who had formed the habit of attending universities. This was not the case. It was clear from the beginning that the colleges were to be equal to but different in philosophical approach from the universities. If this has been established, and in my view it has, then for some students WAIT is better and different from the University of Western Australia and for some other students it is worse. Let me emphasize that the category into which a student falls is unlikely to correlate with the student's intellectual capacity but rather with his or her attitudes and ambitions.

If all this is true then the question that must be asked is - why then do we have this mindless demarcation into two sectors? The more important question is - is the service offered by these institutions likely to be enhanced in the future by a demarcation which pretends that twenty universities are the same, but different from each of forty colleges which are themselves all the same? Is it rather that there is a spectrum of sixty institutions in Australia for which no single measure can justify the demarcation?

The last remaining, totally arbitrary demarcation, is the stand-alone Ph.D. programme for which all universities have a license and all the colleges have not. This arbitrary demarcation is unlikely to increase the capacity of either type of institution to serve the needs of this country. There are certainly academic areas in many universities without the competence to generate and supervise even adequate research programmes - there are areas in some colleges in which the community served directly by the college is clearly deprived by the arbitrary rule that the college cannot run a doctoral programme. There is strong evidence that in some areas in some universities Ph.D. students can find themselves in such an impoverished intellectual environment that the whole programme should be questioned. Such programmes serve the publishing needs of staff more than the intellectual needs of the student and the research needs of Australia.

It is my view that the demarcation is not consistent with the achievement of maximum community benefit from the country's investment in the institutions. Community service is diminished in some universities where courses of advanced education, structure, and philosophy are not offered to the local clientele because of the arbitrary rules of membership of the club, while other communities are deprived because institutions such as WAIT are restricted from entering the univeristy domain or at best retarded in responding by concerns within the bureaucracy about offending their sacred demarcation.

The enlightened Wollongong University model, if it remains honest to the task and restrains those who may see value in full membership of an anachronistic, limiting Australian concept of a university, will provide a unique and immensely valuable service to its community. I suspect that the integrated coordinated programme that should evolve in Wollongong will generate community support, and excellent and relevant courses through the rest of this decade and beyond, while some other places, like Newcastle and Armidale, will struggle with the real meaning of the differences which keep the university and the college apart. These communities are likely to be served conservative offerings.

The simple act of creating a single set of sixty Commonwealth funded tertiary educational institutions in Australia, each funded according to its responsibilities, will not solve all the problems of maximizing the quality and diversity of programmes offered to the Australian community. Indeed, when the local needs are studied and the overlap in the catchment areas is evaluated, it may be that sixty tertiary institutions is in excess of Australia's needs. It may be that a significant number is best added to a set of community colleges offering mainly lower level post-school programmes, complementing the more traditional TAFE colleges, jointly funded by State and Commonwealth Governments and coordinated with the TAFE colleges as a single set of institutions.

It is also important that if a single set of tertiary institutions is formed, critically poised institutions such as WAIT do not aspire to become universities or allow their special character to be eroded by those within the institution who would be more at home in a traditional university-type tertiary institution.

The funding mechanisms established must provide opportunities for WAIT staff who retain a deep and fundamental drive to pursue their personal professional research and development as part of interdisciplinary research teams seeking solutions to the contemporary problems of the community through applied intellectual thought. For those in the university-type institutions, there must be differently structured reward systems and proper funding to maintain excellence in the country's output in curiosity-based pure research in which individuals are trained and developed in a truly intellectual environment of international standards.

I do not have to remind you that pure and applied research are complementary and that neither succeeds without elements of the other. However, it is the difference between the two which will maintain the University of Western Australia and WAIT as fundamentally different institutions of equal excellence, one a contemporary university, and the other sharing the responsibility as a role model for another type of tertiary institution, already established so thoroughly by RMIT over many decades. It is the staff, motivated by their different research opportunities and the different environments in which this research is carried out (WAIT being closer to industry and commerce because of an honest desire to be so) who will guarantee that the undergraduate programmes are based upon different philosophies although of equal professional rigour.

A serious consideration of these alternatives is vital if vested self interest defending intellectually meaningless demarcations is not to stop logical evolution and thus lower the potential of the Australian tertiary education industry to serve the changing needs of the increasingly complex Australian society.

The evolution of our society and of the roles our youth must play has never been so rapid nor so fundamental. Bureaucratic self-interest, insulated from our youth, and retired from professonal practice, will never be an initiator of change. It must be the tertiary institutions themselves and people of vision within them, such as Professor Michael Birt, Vice-Chancellor of the University of New South Wales, who must provide the arguments that lead us to question our complacency and look for future solutions to new problems. Professor Birt has recently challenged the universities to recognise their own diversity and to question whether these differences should not be further developed.

The structure of the coordinating authorities is no longer appropriate to the educational needs of Australia. It inhibits institutions from evolving to meet the new challenges of technology, of continuing education, of post-school community education and of integrating their educational planning with the government's economic and social objectives. It is indeed ironic that the institutions, in daily contact with the students and the membership of the professions to which they aspire, are bound in a strait-jacket of anachronistic demarcation.

These restrictions are diminishing our capacity to serve, lowering our community based political support and destroying government's belief in our capacity to meet the challenges. Government must be convinced that the challenge will be met once the strait-jacket is removed. Change is a prerequisite to a new phase of vitality, and a basis of improved standards in community service. It is also a prerequisite to increased private and public investment in Australian tertiary education.

John L. White,
Deputy Director General,
Department of Technical and Further Education,
N.S.W.

The New South Wales Department of Technical and Further Education has a long history of experience in developing, administering and co-ordinating Advanced Education courses of many types. From 1924, the Department of Technical Education (as we were then known) conducted a wide range of Diploma courses, which were based on Leaving Certificate or Matriculation entry, and which were recognised as suitable qualifications for membership of many professional associations.

In 1949, the University of Technology (now the University of N.S.W.) was established by using, in the initial stages, staff and expertise of the N.S.W. Department of Technical Education. In fact, from 1949 to 1952, the Director of Technical Education was also the Director of the University of Technology. The Department was also involved in the establishment and early organisation of the New South Wales Institute of Technology and the Mitchell and Riverina Colleges of Advanced Education.

In the early 1950's, the Department recognised a need to train large numbers of middle-level personnel to support the increasing numbers of University graduates working in commerce and industry. Thus the Certificate course was developed. In recent times the Department has become involved in training at above Certificate level by the introduction of Post and Higher Certificate courses and Associate Diplomas. TAFE in N.S.W. at present offers some 15 Associate Diplomas at UG3 level in areas as diverse as Nuclear Medicine, Welfare Work, Cartography and Coal Mining.

There are various good reasons why TAFE can continue to meet society's needs in a wide range of Advanced Education:

- First, the nature of the facilities at technical colleges and the background and expertise of the teaching staff are ideally suited to the practical orientation required in most paraprofessional courses.
- Second, much of the plant and equipment and workshop or laboratory facilities required for paraprofessional courses is similar to that required to support trade and certificate courses. In economic terms, this also yields greater efficiencies in the use of such facilities.
- Third, TAFE has various mechanisms designed to ensure that the organisation meets the changing needs of industry and society in general. By means of a network of over 120 industry-orientated advisory committees and frequent surveys of industry, TAFE is able to fine-tune existing programmes and also monitor any overall changes in needs. Each college also has its own college committee whose function it is to determine which courses should be run in the college area and also to report on any local variations in curriculum needs. All TAFE teachers are encouraged to keep in close contact with industry and provisions are actually made for teachers to return to work in industry so that they can update their skills.

** Fourth, the location of TAFE colleges in close proximity to centres of industrial development and activity frequently enhances the opportunities for student access to paraprofessional education programmes most of which are undertaken on a part-time basis. In 1984 there are 96 TAFE colleges in N.S.W., many of which offer, or are capable of offering, paraprofessional courses of one form or another and which are conveniently located near areas of industrial activity.

** Fifth, studies of the career paths of paraprofessional have revealed that while a proportion enter their occupation through an appropriate course at a TAFE college or a CAE after leaving school, a substantial number enter from the ranks of tradespersons and the like by studying Certificate or Advanced Education Programmes. By means of bridging courses, due recognition of academic attainment, specially-designed early stage curricula and adaptive teaching techniques, TAFE provides an avenue for student access to paraprofessional programmes. TAFE's policy of always endeavouring where possible to provide educational programmes having flexible entry requirements is of particular help to migrants who may have completed some studies overseas and others who may be disadvantaged in some way.

POLICY ISSUES IN TERTIARY EDUCATION IN NEW SOUTH WALES

There are some major issues in Tertiary Education in N.S.W. which must be addressed if society's future needs are to be met effectively.

1. Structures and Career Paths in Industry

An issue of particular concern is the extent to which the occupational structures of industry are subject to change. The effects of technological developments, changing world and domestic markets and the general level of economic activity tend to modify the demand for a technical workforce and the functions performed by technicians, paraprofessionals and professionals. Also, the ways of arriving at positions in industry are often diverse, at one extreme being by means of formal full-time courses, and at the other by various combinations of employment-experience and short courses of different kinds. Important influences on this situation include the socio-economic ambitions of some operators and tradespersons who seek to progress in their careers to technician level positions and above, and the special value placed by many employers on practical work experience.

It is important therefore when considering tertiary education to recognise that:

** Tertiary level occupations are in constant change;

** Formal advanced educational level courses based on school-leaver entrance requirements form but one avenue by which people arrive at positions in industry. Attention needs to be given to the role which formal TAFE programmes and professional associations should play in providing alternative paths to these positions.

2. Interdisciplinarity

Increasingly, the boundaries between traditional technical disciplines are becoming less well defined. Over the past twenty years the growth of automation, the development of computer technology and the innovative use of a wide range of materials, processes and techniques across most industrial fields has resulted in the increasing need for technicians, paraprofessionals and professionals to possess inter-disciplinary skills. Nowhere is this more evident than in the growing use of computer aided design and manufacture, where, with the aid of sophisticated computer hardware and software combined with robotic technology and interactive computer controlled machinery, operators, tradespersons, technicians and professionals more and more require a combination of skills which were previously the domain of other occupational groups.

The growing interdisciplinary nature of these occupations requires a flexible approach to tertiary education which in many cases challenges traditional organisational arrangements and course structures. This flexibility is needed by educational authorities, industry, and commerce.

3. Credentialism

A major factor in the growth of tertiary education over recent years has been the process of credentialism. By this is meant the trend towards higher levels of awards and qualifications for occupational positions - either as a consequence of industrial-award negotiations or as pressure from unions and/or professional associations for increased status and reward. The rationale for seeking higher status credentials for technician level positions is often based on increased complexity of work and skill requirements arising from automation, new processes and expanding fields of technology. In more recent times in New South Wales, credentialism has provided a means for achieving equality of employment opportunity. The upgrading of technician level credentials often leads to a blurring of the boundary between technician-level programs and those at professional-level. This process can then lead to further industrial-award problems and further pressures for the upgrading of credentials.

4. Technological Change

Technological developments have a major impact on technician and professional education. Because these developments usually directly affect the job functions of technicians and professionals and therefore course requirements, there is a need for periodic reviews of course curricula to ensure continuing relevance.

Apart from the logistics of course revision, there are issues related to staff development and retraining, the provision and repalcement of plant and equipment and the updating of teaching resources and learning aids.

In some cases the effects of these changes have major implications for classroom accommodation and other facilities such as workshops and laboratories requiring major capital works. It has been a trend that the average cost per unit of plant and equipment has been steadily rising with each successive series of technological developments. The budgetary implication of keeping up-to-date with technological change has therefore become a critical policy issue for TAFE in New South Wales. The huge cost of keeping up-to-date is, however, forcing the development of alternatives to current teaching methods. Simulation of industrial processes is one such alternative.

5. Across-Field Standards

An issue in New South Wales which is frequently raised is the comparison of academic standards of technician level courses across widely different occupational fields. TAFE courses are currently offered in a diverse range of industrial and commerical fields of interest. The accreditation of these courses requires comparison of courses against criteria which need to be applied not only to engineering technician courses but also to courses such as Fashion Technology, Horse Management, Welfare Work and Health Surveying.

Arising from this problem is the need for assessment of the impact which an expansion of technician level education to new fields can have, and the effects this might have on the education system as a whole as well as on industry.

6. Access

In providing opportunities for tertiary education, it is important that he course structures adopted, as well as the location of courses, are such that they provide adequate access for all sections of the community which might require such education. The issue of access to tertiary education relates not only to access in the geographic sense of being able to readily travel to an insitution but also to matters such as:

** **Educational entry requirements** which preclude persons who have not achieved a requisite level of academic study either in a school or in a post-school program;

** **Language difficulties** for persons whose mother tongue is other than English. (There is a need for proficiency in conversational English as well as technical English);

** **Difficulties related to physical disabilities** of students for which due allowance may not have been made in the design of buildings, in the way in which lessons are provided or in the way in which examinations are conducted. In addition, in TAFE, the concept of access is being broadened to one of access to TAFE's educational resources. Such a move requires a new level of co-operation with industry and commerce.

7. Specificity of Training

A policy issue which is frequently raised in technician education and more broadly in advanced education is the balance that must be maintained between training in broad concepts and principles, and the development of hands-on proficiency in the use of a particular piece of equipment. Employers often seek to recruit or to have trained at TAFE institutions staff who can be immediately productive in the use of particular types of plant or equipment.

Given the range of the types of equipment used in industry, the extent of teaching resources required for such a purpose would, in most fields, become prohibitively large. Also the time that would be required to adequately cover the full range would be unreasonable. Even where institutions might be able to provide the types of specific training required, the conceptual base necessary to adapt and transfer skills and knowledge to new technologies or to equipment and plant using new technologies could not be readily developed because of the need to concentrate on the development of specific skills. Education policies should ensure that there is scope both for the development of broad concepts and principles, as well as opportunities to develop some hands-on proficiency on examples or models of the relevant equipment.

CONCLUSIONS

The Department of TAFE stands as equal partner with the Education Department, the Higher Education Board, Colleges of Advanced Education and the Universities in providing society with a total system of education consistent with its needs.

This educational system can meet the future needs of the society it serves but to do so effectively and efficiently the issues I have raised need to be addressed. Adequate provision and effective co-operation between all levels of education will ensure that our society will have access to an educational system of very high quality.

CHAPTER 2

PROFESSIONAL EDUCATION AND THE INFLUENCE OF INDUSTRY

The first two chapters of this collection contain nine papers directly concerned in various ways with the theme of the conference - the relationship between education, training and employment. Most of these papers are written from a CAE or TAFE perspective, the two sectors in Australia which are expected to be more responsive to - if not actually entrepreneurial towards - the needs of the community and of industry.

The first chapter contains three papers. Two are theoretically based discussions of the relationship between a professional course and the industry - via the professional institutions - which it serves. Noble's paper discusses the power plays of vocationalism and professionalism as concepts to which CAEs react in developing their courses, and he asserts that such reaction is mediated by political and financial constraints. Prosser discusses influences on the curriculum in a professional faculty like engineering. He looks in particular at the role and conservative influence of a professional body like the Institution of Engineers Australia.

By contrast, the third paper in this chapter is an empirical study of the apparently declining importance of generalist professional training in engineering in the large metropolitan Institutes of Technology. Turk and Balzer show that engineering staff in these Institutes are increasingly more likely to hold specialist higher degrees and less likely to have had substantial industrial experience. They argue that this is not good for undergraduate engineering education, and suggest means of alleviating the situation.

THE VOCATIONAL - PROFESSIONAL BIAS IN COURSE DEVELOPMENT BY CAEs

Charles Noble
Head, Educational Development Unit
Chisholm Institute of Technology

Advanced education was created as a separate sector of education to meet a range of vocational and professional requirements and this provided the underlying values for the system. The term vocational-professional bias is used to describe these values. It refers to the acceptance of the constraints of vocational and professional requirements in course design and development. The strength of the bias depends on the extent to which advanced education courses must satisfy professional associations and specific vocations.

The initial phase of course development in advanced education was directed to training professional engineers, scientists and accountants. In this phase the power of course planners was constrained because the vocational-professional bias had to be accepted as a condition for attracting funds. Professional associations such as the Institution of Engineers and the Australian Society of Accountants were extremely influential. The constraints they imposed, powerful though they were, gradually lost some of their significance for tertiary education as new course areas emerged. In this second phase of course development general advanced education became more common and liberal arts courses were introduced to cater for more diverse needs than was envisaged in the establishment phase.

There have been several studies of the influence of vocationalism and professional associations. Graycar (1975a and b) has analysed the role of industry in colleges of advanced education (CAEs) and has made a study of power and influence in professional education. Woods' (1978) PhD study gives considerable attention to the influence of vocationalism in the Victoria Institute of Colleges (VIC). The Williams Report (1979) outlines the role of the major professional associations in tertiary education and makes some suggestions for policy changes. To avoid treading ground covered by the studies mentioned above, attention will be confined to the vocational-professional bias as a constraint on course development.

CONCEPTUAL FRAMEWORK

It is not possible to define vocationalism to suit all situations, but a typology developed by Woods offers a useful starting point. In type T vocationalism a course of study could be described as 'vocational' or 'vocationally oriented' if it leads to an award that is acceptable by some employers as an entry ticket for a particular occupation; an example is a Bachelor of Business in Accounting. Type G vocationalism is where completion of a course guarantees its graduates a job. This is empirically rare, although some state education departments in the 1960s and 1970s offered studentships which guaranteed employment on successfully completing a course of teacher education. In type S vocationalism a course imparts skills or knowledge which is actually used by the graduate on completion of the course; some engineering courses are in this category.

For the purposes of this paper it is proposed to add three types to Woods' typology. Type P vocationalism describes the completion of a course which satisfies the requirements of professional registration, such as a four year Engineering degree or four years approved study in Psychology. While it could be said that this is a form of type T vocationalism, it is important in its own right and a distinction should be drawn between a course which is acceptable to employers and one which is acceptable to professional associations. The two types are related, but there are cases of courses satisfying employers but not receiving professional recognition; for example, a Bachelor of Business in Marketing. Similarly, professional recognition does not guarantee employment. The vocational-professional bias was founded on a combination of type T and type P and is referred to as type TP vocationalism. Finally, some course planners have adopted a pragmatic approach and tacitly açcept vocationalism as a means of convincing accrediting and funding authorities of the legitimacy of a course. This is pragmatic vocationalism, or type PV.

VOCATIONALISM

Type T vocationalism was predominant in the early development of advanced education and this was simplified to mean 'meeting the needs of industry and commerce'. As the first report of the Commonwealth Advisory Committee on Advanced Education (1966) emphasised:

> The colleges were set up with the main objective of providing specialised training for vocations and it follows that a close and continuing association must be maintained between college staff and industry on the one hand, and government and business on the other. (para. 2.4.1)

One of the important distinctions between CAEs and universities identified by the committee was "a more direct and intimate relationship with industry and other relevant organisations". (para. 2.4.2) The social sciences and humanities were recognised as a problem area, and the solution was thought to be to gear studies in these areas to specific vocations. (para. 8.3) This contrasts with the more liberal approach adopted in university Arts courses. The strong commitment by the CACAE to moulding advanced education courses to the needs of industry, commerce and government did not prevent a flexible interpretation of vocationalism. This was inadvertently foreshadowed by the committee when it noted:

> We favour the introduction of some broadening subjects in all vocational courses. Such subjects should be specifically designed to meet the needs of students, who should not be required simply to take one or two additional standard subjects. (para. 8.23)

The introduction of broadening subjects involved the recruitment of staff who at a later stage proposed the development of courses of a fundamentally different kind to that advocated by the pioneers of advanced education. (Snedden, 1972) By 1975 the Commission of Advanced Education observed that "Colleges are now offering an increasing range of courses which do not have a direct vocational orientation". (Fourth Report, para. 3.29)

Although an increasingly flexible attitude was taken to the definition of vocationalism, the vocational-professional bias remained a constraint for course planners. The Tertiary Education Commission (TEC) in 1978 appeared to adopt a type S definition when it emphasised the vocational orientation of advanced education. Courses were designed to "produce graduates who are immediately employable and have acquired the capacity to adjust to technological and social change". (para. 32) The TEC noted, however, that "location and community need have resulted in the provision of courses with a less vocational thrust". (ibid.) In the report for the 1982-84 triennium the TEC commented that it should not be assumed that "a particular vocational qualification ... is solely a preparation for a particular vocation or trade". (para. 4.6) Academic qualifications could be accepted by employers as evidence of general as well as specific employability. This suggests a type T vocationalism, which affords colleges some scope to manoeuvre. Far from precluding a flexible interpretation, the TEC provided colleges with arguments to use for a move away from narrow vocationalism.

There has been a broad commitment to vocationalism at the State level, although this is not always enshrined in legislation and the nature of the vocational education favoured is often not clear. The Victoria Institute of Colleges Act, for example, did not refer to vocational education but emphasised broad objects such as to assist and encourage affiliated colleges "to develop and improve tertiary education to meet the needs of the community in general and enrolled students in particular". (S.5(a)(v)) The broad wording of the Act meant that colleges were not constrained by legislation when it came to developing courses which were not narrowly vocational. Although the VIC through its founding vice-president, Dr. P.G. Law, interpreted the "needs of industry" to mean vocational needs, colleges started to develop liberal arts courses which to Law were the antithesis of a vocational education. (Woods, p.87)

Commonwealth and State coordinating authorities did not have the power to impose on colleges a narrow definition of vocationalism. This is explained in part by the lack of agreement as to what constitutes vocational education. The use of vague definitions of vocationalism gave colleges considerable flexibility when developing new courses and they were able to surmount many of the constraints which in 1965 had appeared likely to restrict their course offerings to technological or business courses. It is significant that in 1982 Directors and Principals of CAEs issued a statement which did not emphasise vocationalism. Rather, the focus was on CAEs as "community-service organisations of a particular kind, whose most important objectives relate to identifying relevant community needs through close interaction with the community".

CONSTRAINTS CREATED BY PROFESSIONAL ASSOCIATIONS

The legitimacy of professional associations is related partly to their ability to convince CAEs to accept their requirements when courses are developed or reviewed. If professional association requirements are accepted (type P vocationalism), they may be said to have exercised power. Their ability to do this is affected by a range of factors, including student preferences for courses which entail professional recognition as against those that do not. Furthermore, if employers favour students who satisfy professional requirements (type TP vocationalism), the power of professional associations will be enhanced. These factors may be entwined with legislative authority, such as the requirement that medical practitioners must be suitably qualified. The influence of professional associations is not always well-defined. It is possible that university or college staff who are members of professional associations will be able to influence professional requirements.

The debate over the nature and roles of professions is open-ended and will not be pursued here, but it is necessary to clarify the main concepts before examining the influence of professional associations on course development. The concepts should not be seen as straight-jackets which impose a uniform view of the development from occupation to profession.

A profession is not an occupation but a means of controlling an occupation and the stages an occupation passes through to become a profession are largely unpredictable. Professionalisation is an historically specific process which some occupations have undergone rather than a process which certain occupations may always be expected to undergo because of their inherent qualities. (Johnson, 1972) The educational system can play an important role in this process as tertiary courses help to afford legitimacy to professions. (Jackson, 1970) Qualifying examinations are a traditional way of controlling entry to a profession. They may be conducted by a professional association itself or university and college courses may be granted professional recognition. There are obviously substantial costs to professional associations in conducting qualifying examinations and they rely increasingly on courses conducted by tertiary institutions. This tends to reduce their power to make significant changes in professional requirements, such as an increase in the length of training.

The close links between CAEs and professional associations may create some tensions for the institutions concerned. On the other hand there are advantages accruing to type P vocationalism. Colleges and professional associations may develop respect for mutual managerial and decision-making autonomies and may benefit from participation in policy-formulating areas. (Feehan, 1973) It could be that a professional association influences the structure of a college course, but that the college in turn influences the policies of the professional association. Both groups may reach agreement on goals to be achieved.

CAEs may be disadvantaged by close contact with professional associations. A close relationship may lead to excessive pressure being brought to bear on a CAE to protect the interests of the association. An example is pressure to increase the specialised content of a course to satisfy professional requirements. Duke, Sommerlad and Berry (1980) note that in attempting to press for professional status, an occupation may adopt the strategy of advocating an increase in the number of years of study required to obtain the professional degree. This may be an advantage for the CAE if it obtains extra resources to run an extended course, but a disadvantage if funding authorities do not provide resources to match the new development. An analysis of disadvantages is further clouded by the fact that course planners may perceive close relationships with professional associations to be advantageous. The effect may be to strengthen the constraint of type P vocationalism and to reduce the autonomy of the college.

A further dimension of professional associations is the way in which they are viewed by colleges. There is a strong tradition of involvement by professional associations in course development. In the VIC the influence of professions was asserted from the start, especially in engineering. According to the first annual report of the VIC Council (1967) the majority of the founding principals were engineers and members of the Institution of Engineers (Australia). Professional education in engineering provided a model which was emulated in other areas such as accounting. At a later stage more broadly-based courses emerged which did not depend so heavily on professional recognition. In courses dependent on professional recognition, this was not necessarily viewed as an undesirable constraint. Graycar concluded that while most of the academics in his survey of NSW colleges and universities accepted that there is Institution of Engineers' influence, they do not regard it as a constraint on academic autonomy. Similarly, a case study of course development in a CAE in Melbourne indicated that the constraint of professional association requirements is frequently accepted as non-negotiable by academic staff. (Noble, 1982)

NEGOTIATIONS TO SURMOUNT CONSTRAINTS

Acknowledging the vocational-professional bias as a constraint, course planners have three alternatives. First, they can choose to ignore the constraint, in which case the likelihood is that their course will be rejected or considerable difficulty may be experienced before it is approved. Secondly, the constraint may be accepted and the course tailored to type T, G, S or P. This approach is by far the most common because it offers the best prospect of being funded. Thirdly, type PV may be followed.

Acceptance of vocationalism is a means to survival. With a slower rate of growth in student numbers, colleges use their connections with employers as a means of justifying course proposals or even their continued existence. In addition, it is a potential means of securing an advantage over competitors. A college may be asked by an employer to develop a particular course or it may respond to perceived needs. If it is successful in having the course accredited and funded, the college benefits by either attracting additional resources or retaining the resources it has secured in past negotiations. That is, the college is able to assert its influence even though there are significant limits to its power. An employer who successfully approaches a college to develop a course may be said to have exercised power. Benefits to the employer include access to more highly trained manpower without the need for extensive (and expensive) in-service training. Although such approaches are fairly rare, (Noble, 1982) they do represent a noteworthy aspect of the relationship between colleges and employers.

By far the most significant way of involving employers is through the course advisory committees established by colleges. The strength of the influence of employers depends on such factors as the proportion of employers on the committee, the extent to which they are in agreement with each other, and the willingness of the college to accept their advice.

CAEs are not obliged to satisfy professional requirements, but they frequently do so to add weight to course submissions or to ensure the employability of graduates. In pursuing type P vocationalism, colleges must forego some of their autonomy. This may produce benefits for individual schools and departments; for example, a psychology department may attract additional resources to run a graduate diploma course. Whereas in a period of growth additional funds could be obtained with relatively little difficulty, fiscal constraints in operation in the late 1970s and early 1980s meant that any increase in the length of courses taxed internal college resources.

The result was that a benefit to one school or department could disadvantage another school or department. In the context of stagnation in engineering enrolments the 1980 rule which increased Engineering degrees from three to four years helped CAE engineering schools to justify maintaining staffing at existing levels. Conversely, it gave added impetus to the rationalisation of engineering courses in the colleges sector because the additional year of education made it more difficult to contain costs.

A professional association may exercise power by refusing to grant recognition to a course, but this does not mean that the course cannot operate. The association has to rely on a state coordinating authority refusing to accredit a course or students avoiding courses which do not entail professional recognition. It is obviously safer to tailor a course to professional requirements, but to do so can involve extensive negotiations. An Industrial Engineering degree developed by the Caulfield Institute of Technology in 1979-80 challenged the convention of an engineering course based on specialisations such as civil or mechanical engineering. The course adopted an interdisciplinary approach, drawing on the mathematical, physical and social sciences as well as the principles and methods of engineering analysis and design. After protracted negotiations, and despite opposition from a rival CAE, the Institution of Engineers eventually registered the course.

The experience of Industrial Engineering raises the question of whether a CAE is able to influence a professional association to change its policies. CAEs together with universities contribute to the process of professionalisation by defining what constitutes knowledge and in framing the professional role. (Duke, Sommerlad and Berry) In so doing they may help to mould professional opinion as well as being subject to the influence of professional associations.

OVERVIEW

Vocationalism has been shown to be a means of control over educational institutions in which power is exercised by employers in conjunction with governments and coordinating authorities. The power of employers may be limited by difficulties of presenting a united front in negotiations with CAEs, especially as the interests of employers in all areas may not coincide. CAE courses may be tailored to various patterns which were designated as type T, G and S.

Professionalism is a form of occupational control and professional associations have used their links with the educational system to increase their power. The operation of types P or TP vocationalism is a manifestation of these links. The option of ignoring professional association requirements is available to course planners, but there is the risk of weakening the rationale for the course by failing to gain professional support. Similarly, a risk is taken in ignoring vocational needs. Type PV vocationalism afforded the means of acknowledging the existence of the vocational-professional bias by providing an acceptable framework which would not necessarily constrain the course at the time of implementation. Professional associations and employers lack the mechanism to monitor changes in detail.

The vocational-professional bias may operate quite differently in particular colleges and courses and over time. The early development of CAEs saw attempts to emphasise vocational education in course development. For the most part this took the form of type T vocationalism. The influence of professional associations in course development was extended as colleges sought to guarantee the quality of their courses and to maximise the employment opportunities of graduates. Type P vocationalism merged with type T vocationalism and this combination seemed likely to endure. There was some enthusiasm for forging links between tertiary education and the labour market by using manpower forecasting as a basis for educational decision-making.

Several factors coalesced to temporarily weaken type TP vocationalism. Towards the end of the 1970s the existence of a tighter employment market questioned the wisdom of gearing courses to specific vocations or professions. General education in contrast offered the hope that if a graduate missed out in one area there would be opportunities elsewhere.

Vocationalism became increasingly difficult to define and some colleges adopted type PV vocationalism to justify the employment potential of their courses. Local needs started to assert themselves and some CAEs began to highlight the needs of their local communities in course development. At the same time there was growing scepticism about the constraining role of professional associations. For colleges the associations have the effect of narrowing the range of course development options and for the system as a whole there is the cost of extending courses to satisfy professional requirements. Support for general education proved fragile and the vocational-professional bias was re-asserted by governments and coordinating authorities, but in a different form. Instead of embracing manpower planning in all course areas, the TEC advocated education and training which would permit flexibility in the labour market. This meant that courses should be designed to fit students to a wide range of occupations rather than narrow specialisations.

The vocational-professional bias is not insuperable nor is it constant in its effect. Professional association requirements may be challenged or ignored and the Williams Report foreshadows a less dominant role for the associations. The need for course planners to obtain the widest possible support for their proposals may offset these factors. Vocational education is still regarded as important, but course planners are helped by the fact that there are many varieties of vocationalism. Colleges may be able to surmount these constraints by negotiations over time, but their capacity to do so may be affected by the state of the economy, government policy and so on. If the constraints are accepted a college faces some loss of autonomy, and this must be weighed against the compensating benefits.

The vocational-professional bias is part of prevalent academic values which may limit the scope for innovation. Faced with an uncertain policy environment CAEs frequently opt for the safe approach to help achieve the implementation of courses. Instead of being offered a real choice students are confronted with the sterile conformity of courses moulded to vocational and professional requirements. CAEs may therefore forego the opportunity to influence the directions taken by the professions by challenging the established professional wisdom.

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REPRESENTATION OF THE PROFESSIONS IN CURRICULUM DEVELOPMENT

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What is taught in higher education, how it is taught, by whom, with what aims in mind, with what success, and within what sort of guiding policy are all issues that several groups of people feel they have the right to influence. Some take an authoritarian attitude; others think they have the right to ignore the views of other groups. Perhaps, as Bligh (1982) has so cogently argued, the best compromise is that groups with sufficient interest in higher education may ask questions about what is done and why, and be entitled to an answer and to comment on the answer, but that is the end for all groups except the teachers. The reasons underlying the concern and influence of the different groups are diverse. The teachers involved in planning a curriculum, then teaching it, must find an effective compromise with the several influences. Those who teach with the purpose, inter alia, of training students for a profession have accepted the right of outsiders to influence the curriculum, because one of the distinctive characteristics of a profession is that it controls the training and required standards of knowledge of its members.

In the first part of this paper the diverse, justifiable influences of most of the different groups are characterised. In the second part, the problem of obtaining a valid and distinctive influence from the professions is discussed, in the context of the physical sciences and engineering with which the author is most familiar.

THE GROUPS AND THEIR EFFECTS

As a number of the characteristics of these groups have been discussed elsewhere (Prosser, 1982) the following is a summary plus some additional points.

The Teachers

Inevitably each teacher has a powerful influence on how a subject is taught. Within a course prescribed by a larger group of teachers, the response made to students in various situations, the precise balance between topics, the degree of abstraction or practicality, the balance between qualitative and quantitative representations, the selection of illustrative material and exercises, and so on, are all largely the unchallenged responsibility of the teacher.

In higher education teachers collectively play an important role in subject selection, subject development and curriculum planning in general. Indeed, it may appear that the other groups are not involved in planning but only react to the plans of the teachers. That view underrates the influence of the other groups. Although some teachers may well plan curricula entirely by their own criteria, most plan according to how they expect some of the other groups to react. Notwithstanding a considerable degree of freedom, the basis for much curriculum planning is unquestioning conformity by teachers to an implied 'norm'. When teachers are queried about their curriculum the reaction is far more often of the kind 'we think we have satisfied the requirements because our curriculum is similar to that of other departments' than of the kind 'we know we have planned something different but we believe it is justified'.

Thus, there is a distinctive input from the teachers, but it is more uniform than one might expect from the degree of academic freedom enjoyed by staff in most institutions.

The Students

Student influence on the curriculum is relatively new and remarkable for the traumatic events which accompanied its growth. However, the crusade is over; the system has changed; and what remains of continuing, direct influence is of little consequence (in science and engineering at least).

The staff of the higher education units have taken up the students' cause and pursued it with more skill and persistence. Many teachers appreciate the more perceptive interpretation of the students' needs presented by the unit staff. Through this group a distinctive, student-oriented influence has been exerted, but few would argue that it has been generally effective.

The Custodians of the Discipline

This imposing title is assumed by the senior academics. These people, in that role as distinct from any teaching role they may have, make contributions to curriculum design and evaluation like:

- 'subjects A, B and C are the essential basis for any course in this discipline';
- 'we must deal with the fundamentals and not be superficial';
- 'there is only time to cover the basic principles (theory), the students can learn how they are applied later';
- 'if it is not done quantitatively it is not worth doing at all'.

On the credit side, these comments ensure that the basic concepts of a discipline are identified for and explained to the students. If presented in an appropriate way they may help the more perceptive students to start to understand how concepts and theories are developed. Also, this emphasis helps to ensure that the graduates of a course are accepted as members of the international community of scholars in that discipline. On the debit side, these comments emphasise knowledge at the expense of skills, and theory at the expense of practical considerations. They often have the effects of reducing the students' motivation, and of suppressing ideas and concepts which can only be expressed in qualitative terms but nevertheless provide insight, purpose and balance for the newcomer to a discipline. The comments are authoritarian and in conflict with teaching methods which allow the students to control their own learning to a considerable extent.

This group, therefore, has a powerful, distinctive and restrictive influence on curricula.

The Higher Education Authorities

These authorities range from the Commonwealth Tertiary Education Commission to committees making decisions on broad academic issues within an institution - any group of people with formal responsibility for, inter alia, academic policy or practice within all or part of the higher education sector. There was a time when the primary concern of such groups was to ensure that appropriate opportunities and resources existed to allow able students and scholars to pursue their intellectual activities in whatever way seemed appropriate to them. Most students and junior members of staff would not have been particularly conscious of these groups and would have expected them to be generally supportive of any form of teaching, learning and scholarship that was acceptable to scholars elsewhere. Now that role has been compromised by considerations of productivity, relevance and cost. These groups are feared for their new role (often unwilling) of cutting costs. Students and scholars alike feel threatened by actual or possible reviews; the short-term effects are often non-constructive.

These groups look like being the instigators of the traumatic changes of the 80s. Their influence has changed, with deliberate intent, and they control the most powerful single instrument for influencing curricula - the financial resources for staff, buildings, equipment, etc. It has become clear that none of the other groups, even collectively, can save an academic activity in an institution once the decision has been made by some higher education authority to withdraw financial support. The most unfortunate characteristic is that these groups are often remote from the teachers and the students.

Governments

In Australia, governments have the paymaster's right to influence what is done in higher education and have exerted that right, initially to expand and improve higher education, but recently to make it more cost effective. Governments have also used higher education to help achieve broad socio-political goals, such as providing opportunities and rewards for enterprise and hard work, or for equalising the opportunities available to all young people.

While governments and politicians in general have no direct influence on curricula, their policies have a marked effect via various higher education authorities, as discussed above. The remoteness of teacher from government may provide some protection for the teacher as a result of the slight changes of emphasis in the policy as it is applied through CTEC, institution, faculty and department. However, the same characteristic of diffuseness 'protects' government from discovering the real consequences of policies.

The Employers of Graduates

No matter if one regards higher education as 'preparation for life', or 'developing the intellect', or 'learning how to think for oneself', or as 'training for some specific activity in society', one can hardly ignore the fact that the great majority of people become employees after their experience in higher education. Being an employee is a significant part of 'life'; working as a professional involves using the 'intellect' and 'thinking for oneself', and so on. All groups expect higher education experience to influence what the individual does in employment, and accept that there is an

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effect. The reverse influence is much more contentious. There is no agreed answer to questions like 'should higher education curricula be influenced by the requirements of employment?'; 'should any influence be direct and specific, or indirect and as broad guidelines?'; 'should any procedure to influence be formal and standardised, or informal and according to local preference?'; and 'who should be exerting the influence - managers, experienced employees or the professional institutions?'.

The reality is that, in the physical sciences and engineering, influence is expected and exerted in different ways, with a wide spectrum of formality and directness, and by different categories of person. It has not been unusual for departments in a period of difficulty to turn to employers for support of academic activities. The response has usually been constructive and sensitive to the autonomy of the academic staff. Some employer representatives are as perceptive, incisive and fundamental as any scholar of higher education in their analysis of the employers' expectations of people emerging from higher education. The following statement by Buley (1972) is an example of how clear and distinctive the employers' rationale can be (when referring to university graduates):-

> "A graduate is someone who, by undertaking an intellectually demanding study of one or more bodies of organised knowledge, principles, hypotheses and ideas, has acquired certain fundamental intellectual qualities, including the ability to learn and to apply learning in new and unfamiliar situations. (Buley's emphasis) During this process, the graduate will also, we hope, have acquired knowledge and skills which are immediately useful, but this is neither a necessary nor a sufficient condition. The definition, it should be noted, is not in terms of the duration of the course, nor of its content, since these will vary for different individuals, but in terms of his aptitudes, attitudes, and behaviour at the end of it. (pp. 55-6)"

Overall, the influence of employers has been more successful in supporting the effects of other groups rather than in bringing about changes of their own design.

Past Students

The main justification for higher education is to provide long-term benefits for those who participate. Who better than past students to tell all interested groups what was beneficial, what was of little value and what was missing? The principle is sound but the application is often suspect. There are three problems associated with the past students. First, the group is not coherent, and active sub-groups are not often representative of the whole group. The second problem is more serious; it is a lack of awareness of the pertinent facts. No past student (nor anyone else) is aware of all that he or she learnt from a higher education experience, although there is a greater awareness of what had to be learnt subsequently. The third problem shows up on the few occasions when the first two have been overcome: hardly anyone seems to take any notice of the collective views of this group. Because there is no direct and continuing means for this group to exert its influence it is ineffective.

The unique quality of the past students' statements is the specific, practical illustrations they provide of the more generalised ideas expressed by other groups. Like the employers, past students tend to emphasise attitudes and skills. These characteristics have been discussed elsewhere (Prosser, 1982) and will not be elaborated here.

The Community at Large

Many people, including many of those in the other groups, react to higher education in various roles, such as parents, taxpayers, 'friends' of some institution and members of groups trying to influence society's attitudes and practices. Generally, these groups have a less substantial case for directly influencing higher education curricula than the other groups discussed. Nevertheless, one can visualise a parent or a taxpayer, in particular, asking some distinctive and pointed questions about what precisely is being taught, how, and with what success.

The Professional Institutions

The professional institutions exert their influence through accreditation. The institutions are granted authority to decide who shall practise the profession. Most professional institutions take this authority one important step further through a plausible administrative argument. Instead of scrutinising each individual applicant's case separately, it is administratively more convenient to scrutinise the contents of courses offered by local educational institutions as preparation to practise the profession. It is not people who are being accredited but courses and, in the reality of the scrutiny, departments and staff in the educational institutions as well. In the 'tight' professions an educational institution offers its proposed course to the professional institution; the future of the course and the department hangs on the response. At least one Australian professional institution refuses to consider for membership a graduate from an Australian course which has not been accredited.

While it is reasonable that a professional institution should be able to influence the curricula which are offered as a basis for entry to that profession, there are fundamental problems associated with that influence in the disciplines of physical science and engineering. These are discussed below.

PROBLEMS WITH THE PROFESSIONAL INFLUENCE

Two problems are analysed here which do not appear to have been discussed before in the context of Australian higher education. Put as questions they are:

- what is the distinctive influence which the profession is expected to have on the curricula, and who has the knowledge and authority to exert that influence?
- in the reality of how accreditation works, what are the consequences of an unsatisfactory answer to the first question?

Distinctive Influence

Two essential characteristics of the classical professions should cause a distinctive component in the influence. First, the members of the profession are possessed of knowledge and skills which others do not have. Second, the profession has the authority to regulate how its members interact with their clients. Thus, the practising professionals are assumed to be the sole possessors of the specialised knowledge and skills. Once more the principle is sound but the application is problematical. Graduates of one particular discipline use some of the knowledge and skills which they acquired when they were undergraduates when practising as researchers, designers, consultants, resolvers of serious technical problems, resolvers of customer complaints, marketers of products, supervisors of operators, teachers, and as managers. It is remarkable how little professionals in these different functions have in common, in terms of the specialised knowledge and skills which are actually being used. Equally remarkable is the amount of general knowledge and skill which is required in all of these functions and which is not taught in any normal undergraduate curriculum.

Faced with this diversity it is difficult to nominate who precisely should be responsible for selecting the bodies of specialist and general professional knowledge and skill that are to make up the curriculum of an accreditable course. There is no evidence to suggest that accreditation committees have resolved this problem, nor do they seem to expect a constructive response to the diversity of practice in the design of curricula.

Analysis of the way the professional institutions are drifting, in terms of members' interactions with clients, raises other fundamental doubts about the distinctive influence of the professions. Interaction with clients is to do with the power, ethics, values and attitudes of a profession. There are many professions (including the physical sciences and engineering) which have no clients in the classical sense. Johnson (1972) demonstrates most convincingly that professions consisting of people who are employed by corporations operate in a system of patronage. In brief, Johnson's conclusions are that these professions have little power and that their ethics, values and attitudes are dictated by their patrons (the employers). Even the specialist knowledge is largely determined by the dominant patrons. There is no evidence that any of the Australian professional institutions in science and engineering is trying to change this situation. On the contrary, many are showing evidence of a willingness to subjugate themselves completely to the patrons. Consequently, there is no distinctive influence from these professional institutions in terms of ethics and values. Even those members of a profession not employed by the corporations are showing signs of the influence of the corporation's patronage - for example, the number of people in universities and government agencies working on contract research for industry.

Realities and Consequences of Accreditation

There are two notable consequences of the procedures and problems outlined above. Accreditation committees in the physical sciences and engineering are dominated by senior academics, both in numbers and presumed expertise. There may be a smaller, less expert group (in terms of educational issues) consisting of employed professionals at the management level or principals of consulting groups. The senior academics in particular seem to use the committees to exert the same influence that they exert in their own departments as custodians of the discipline. The other members seem to be much less effective in exerting the employers' or any other distinctive influence. This is probably the reason why professional institutions exert no pressure to have curricula reflect the diversity of professional practice.

Even if in reality an accreditation committee does try to take a more radical view of the aims of curricula, teachers in the discipline still expect it to be conservative and, because of its power, will not be inclined to test its limits of tolerance. Thus, there is a great inertia in the system and innovations are made by only a few determined entrepreneurs.

The comments of accreditation committees are confidential hence it is not easy to analyse their nature. The author has seen some comments, talked to the recipients of others, and discussed the issues with the leader of a group about to set up an accreditation procedure for a professional institution. There seems to be an overwhelming preoccupation with subject matter - just names of topics. No verbs are used to describe what the teacher is expected to do, or the student expected to learn to do. The only exception to that observation is an occasional query about the quantitative treatment of topics. Sometimes the formal qualifications of the acadmic staff become an issue. People with formal qualifications outside the directly relevant discipline(s) are suspect and, if there are too many in this category, accreditation may be witheld. What people may have learnt and practised in, say, 20 years since graduation is not taken into account.

SUMMARY

Overall, therefore, the following points seem to characterise the influence which the professional institutions in physical science and engineering undoubtedly exert on curricula.

1. In principle, the professional institutions' influence is as valid as that of any other group outside the educational institutions; it could be distinctive.

2. Professional practice is diverse in terms of the knowledge and skills used in different functions.

3. Because the members of the professions are employees, the professional institutions operate within a system of patronage, in which the values of the patrons (employer corporations) are dominant. In reality, the professional institutions have developed no substantial, independent account of the diverse knowledge, skills and values necessary to practise the professions.

4. The accreditation committees are dominated by senior academics who present to the professional institutions the views of 'custodians of the discipline'.

5. In the absence of an effective group with a clear, independent account of professional expertise, no distinctive influence is exerted on curricula by the professions. The diversity of professional practice is not reflected in the curricula.

6. The consequences are, first, that professional education is barely relevant to the full range of professional activities and, second, that innovation is discouraged.

7. Such innovations that do arise are initiated by individuals or small groups of academics and not by the professions. These people receive little or no support from the professional institutions.

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VOCATIONAL EDUCATION FOR ENGINEERS

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1. INTRODUCTION

This paper is based on the results of a research project which aimed at establishing whether the changes in undergraduate engineering education over the last 20 years are in response to industrial needs or have other causes. The project is described in a Master of Engineering thesis "Engineering Education - I.L. Turk NSWIT 1982".

The major findings were that the reason for changes in engineering education do not appear to be based on industry needs, but are based on academic policies, mainly recruitment. Much engineering education appears to be too specialised and lacks commercial and management content.

2. EMPLOYMENT OF PROFESSIONAL ENGINEERS

The majority of engineers undertake more and more management functions as they advance in their careers.

A survey of 20,818 Australian engineers reported by Balzer (1982), shows that over 40% of Australian engineers act in management positions. Less than 5% of engineers perform no managerial functions at all. The majority of engineers commence acting as managers by the time they reach their early 40's in Australia and somewhat younger in the UK.

The British Association for the Advancement of Science (Education, Engineers and Manufacturing Industry, Aston, 1977 page 30) Report shows that of the engineers surveyed, more than 70 percent were employed in managerial functions rather than in specialist engineering jobs by the time they reached the 35-39 year old age group.

Employment patterns for engineers show that an engineer will probably be concerned with more than one of the various areas of engineering practice. He will progress through a number of these, as he becomes more senior. It is therefore important that the professional engineer receives education which as far as possible fits him for the commencement of practice as an engineer over a wide range of possibilities. Only relatively few engineers require high technical expertise on graduation.

The Metal Trades Industry employs some 70 percent of Australian professional engineers (Metal Trades Industry Handbook 1980). The MTIA stated in the Metal Trade Industry Journal (May 1978) that it:

> ".....is aware of the difficulties experienced by the industry inducting those with tertiary qualifications into the management structure of the organisation. Graduates and diplomates experience difficulties in relating their academic knowledge to the realities of organisational life, where generally the

> profit motive is paramount. ..... The content of courses may, to some degree, contribute to this problem. Tertiary institutions, keeping abreast of emerging technology may have lost sight of the requirements of Australian industry. Nearly 75 percent of Australian factories in the manufacturing industry employ less than 20 people ..... it is conceivable that the opportunity for using sophisticated techniques is limited...."

Lloyd (1980) makes a number of further supporting comments, including:

1. Course content is not attuned to the needs of the work place.
2. Introductory studies in management are essential to professional engineering industry.

Balzer (1982) and others also make the point that engineering managers (and engineering teachers) must be experienced engineers.

3. QUALITIES LOOKED FOR BY EMPLOYERS

The committee of inquiry into the engineering profession in the United Kingdom (Finniston 1980) made a detailed study of employer and industry attitudes to the education of engineers. Finniston (page 55) states:

> ".....a great many employers expressed dismay at the difficulties they found in recruiting the main stream of engineers with the experience and ability to apply and maintain the best current technology in day to day operations ..... those responsible for the formal education of engineers and the graduates themselves must recognise that graduate engineers are required not only for leading new technological advances, but also for much main stream engineering work concerned with application of management....."

Most British degree courses provide specialist education, with students registering in discipline based courses from the outset. There are very few unified degree courses where students study engineering science over a wide field and concentrate on their particular field only in the final stages. This is equally true in Australia.

There is considerable evidence (Turk 1982) that what is taught to students is frequently related to the state of the knowledge of the science as perceived by the educator. The changes in the engineering curriculum do not seem to reflect the changing needs of the profession, as much as the changing technological content of the art (which is probably more scientific than engineering).

4. CHANGES IN ENGINEERING EDUCATION

A comparison was made with overseas practice. It became clear that Australian engineering education has changed since 1955 until it now offers the most specialised courses with the minimum of management content of any of the major countries examined.

While this change to specialisation occurred in Australia, there was a parallel change in the academic qualifications of engineering educators (Turk 1982).

For example, in the Faculty of Engineering at Melbourne University in 1955, 61% of lecturers held Bachelors degrees and 17% Doctorates. In 1980/81 65% of lecturers held Doctorates and 1% held only Bachelors degrees.

4.1 CHANGES IN COURSE CONTENT

Three typical years were chosen for analysis of changes in course content, namely 1955, 1967 and 1980-81.

To compare educational content in a number of courses offered by institutions over 25 years, a common and unchanging terminology is required. Lloyd's classifications (Lloyd 1968) were modified so that they may be applied more generally to a comparison of curriculum structure in different educational institutions.

TABLE 1:
CLASSIFICATIONS FOR COURSE CONTENT

Classification	Description
1	"Basic Science Education" (Mathematics, Physics, Chemistry etc.)
2	"Introduction to Engineering" (Common core subjects (engineering science) such as electrical theory, thermal dynamics, structures, fluids etc.)
3	"Engineering Specialisation" (This classification was divided into 3 parts, 3a introductory, 3b advanced, 3c other disciplines at higher levels).
4	"Business Education Subjects"
5	"Non-vocational (Humanities)".

TABLE 2:
COURSE CONTENT IN MAJOR UNIVERSITIES

CLASSIFICATION	1955		1967			1980/81		
	SY	MB	SY	MB	NSW	SY	MB	NSW
1	18%	12.5%	25%	25%	20%	25%	10%	15%
2	17	12.5	20	20	23	15	8	15
3a	25	25	25	27	25	30	35	20
3b	25	25	27	27	25	27	45	38
3c	15	10	3		2	3	1	4
						or		
4	0	10	0	3	2.5	3	1	4
							or	
5	0	5	0	3	2.5	0	0	4

Table 2 above shows the percentages of total course contents in the various categories of subjects as taught for undergraduate engineering degrees in Sydney University (SY), Melbourne University (ME) and the University of New South Wales (NSW). Those universities were chosen as being typical of the major universities in Australia. Examination of other University and CAE handbooks has shown only minor variations from the patterns given in the table above.

The Aston Report (1977 page C40) gives additional information on the proportion of time in engineering courses allocated to various subject groups in selected countries in Europe. Table 3 displays this information for 1977 with the Australian and American positions added.

TABLE 3:
TIME ALLOCATED TO VARIOUS SUBJECT GROUPS IN TYPICAL ENGINEERING COURSES

Country	Technology Science, and Maths.	Economics, Law Management, etc.	Humanities and Liberal Arts
(1980) Australia	94.0%	3.0% [1]**	3.0% [1]**
France	82.8	13.0	4.2
Germany	88.8	9.2	2.0
UK	88.0	6.8	5.2
USA	70.0	14.0 **	6.0 **

* Journal of Engineering Education, Spring 1977, p.66.

** Flexibility of course allows some choice between Humanities subjects and Management subjects.

Until about 1955 most engineering degree courses appeared to have a common base curriculum for the first one or two years of study. This was particularly evident in courses leading to degrees in mechanical and electrical engineering. The final one or two years of full time study (or equivalent for part-time students) then concentrated on specialist engineering options.

By 1967 full time engineering courses had changed. Specialist disciplines began to intrude into earlier years of the undergraduate course and interdisciplinary options were reduced. Students were offered more specialised courses and much less stress appeared to be placed on some practical subjects like engineering drawing.

By 1980 the trend to specialisation had increased further. Common core subjects across disciplines were limited to basic science subjects.

Most courses offer some optional humanities and business subjects in the final year, but these only represent a small percentage of the total course time in many institutions in Australia. An exception is the NSWIT where students in the BE (Mechanical) course can now take up to 18% of management subjects. Overseas, particularly in the USA and France, there seems generally to be more time allocated to business management subjects.

5. MODELS OF CURRICULUM CONTENT

Gerstel and Hutton (1966) suggest what they perceive to be an "ideal" university engineering degree course. This is shown in Table 4.

TABLE 4:
"IDEAL" UNIVERSITY ENGINEERING DEGREE COURSE

SUBJECT GROUPS	Percentage of total time
English & Humanities	7)
Technical Report Writing	7) 21
Foreign Languages	7)
Industrial Administration, economics, and social sciences	10
Fundamental sciences: mathematics physics, chemistry	23
Basic engineering sciences	27
Design engineering	13
Specialty Engineering	6
TOTAL	100%

It is of interest to note the high content of what might be termed as business studies in Gerstel and Hutton's model. Gerstel and Hutton allow a 10% content for this purpose and allow a 14% content for language studies and humanities. There is not much evidence in this and other research that humanity studies make any substantial contribution in engineering education. If the content of humanities were reduced and foreign language studies eliminated this would allow an increased proportion for speciality options in Gerstels and Hutton's suggested model.

It is of significance that the model allows 50% of the course content for sciences and broad based general engineering science.

Lloyd (1980) suggests additional aspects which should be added to a model for engineering education, including such things as communications, technological change, industrial relations and computers. Turk's (1982) research confirms Lloyd's view particularly as far as human communication is concerned (Turk 1982).

The authors submit the following content model for a degree course which is more attuned to the needs of practising engineers than those currently available in Australia.

TABLE 5:
PROPOSED ENGINEERING DEGREE COURSE

SUBJECT GROUPS	Approximate total time
Communication & Report Writing	7%
Industrial Management, Cost Control, Economics & Behavioural Science	13%
Law, Industrial Relations & Options	7%
Basic Science	23%
Engineering Science	27%
Design Engineering	13%
Specialty Engineering	10%
TOTAL	100%

6. SUMMARY OF FINDINGS ON EDUCATIONAL NEEDS

The evidence presented raises some important issues. Most of the young engineering graduates in their early careers require practical experience and practical knowledge of application rather than highly specialised knowledge. This is particularly true of the activities which are covered in "main stream" engineering.

In the majority of cases, the new graduate in his/her early years of development is required to solve pragmatically real engineering problems of a sometimes quite general nature. He/she seems to be inadequately trained for these situations.

As engineers reach the age of about 35-40 years the majority of them are engaged in engineering management or even general management functions rather than specialist engineering functions. In Australia training for those functions is often minimal.

Engineering education seems to respond rapidly to technological progress. Changes have been made rapidly to engineering courses to accept new and changed technology. Often this is ahead of engineering practice in industry. The issue of whether the changes are in the best interest of the students is not always considered.

The changes in engineering courses over the last 25 years have thus been towards narrower, more specialised and less practical education. The exceptions to this are sandwich courses, typical of which are those offered by the NSWIT.

7. STAFF CHANGES

Parallel with the curriculum changes described above, there have been very significant changes in the qualifications of the engineering lecturing staff at universities and other institutions. These changes are shown in Table 6.

TABLE 6:
ENGINEERING FACULTY STAFF BY HIGHEST QUALIFICATION

	1955		1965/6		1980/81	
UNIVERSITIES	SY	MB	SY	MB	NSW	MB.
Total Staff	34	40	*	*	134	84
Bachelors degree	60%	61%	42%	38%	15%	1%
Masters degree	20	22	21	32	29	34
Doctors degree	20	17	37	30	56	65

	1965					1982				
INSTITUTES	RMIT (1965)	NSWIT (1967)	SAIT (1965)	WAIT (1965)	QIT (1970)**	RMIT	NSWIT	SAIT	WAIT	QIT
Total Staff	*	17	21	24	32	97	58	52	61	63
Bachelors degree (or none)	96%	64%	87%	90%	56%	25%	11%	31%	43%	35%
Masters degree	2%	29%	3%	7%	34%	31%	48%	52%	38%	57%
Doctors degree	2%	5%	10%	3%	9%	44%	41%	17%	19%	8%

* Not available.
** QIT had an engineering staff of only 12 in 1967 of which 2 had higher degrees and 6 had no degrees at all. 1970 was chosen as more indicative.

Note the change in qualifications of lecturing staff particularly at the NSWIT and RMIT.

In the two major universities in 1955, less than 50 percent of engineering lecturing staff had higher degrees. 25 years later, the next generation of lecturers nearly all hold higher degrees, with a majority holding doctorates.

Lecturers need to be familiar with current practices and with industrial problems so that their teaching activities are informed and relevant to industrial requirements. As a direct result of the appointment of lecturers with higher degrees, the number of lecturers in service with substantial and up to date practical experience is rapidly declining. Practical experience is often a low rating factor in the appointment of lecturers.

There is substantial evidence of these adverse trends also being followed in the UK (Finniston 1980, p 241).

In the research undertaken for the preparation of the Finniston Report, questionnaires were sent to a structured stratified sample of those teaching in engineering departments in universities, polytechnics and other institutions offering degree courses in engineering.

The report comments:

> "Nearly a quarter of the teaching staff in those universities which were not previously CATs* have never worked in industry and well over half of all our respondents were ten years or more away from direct industrial experience. Thus, although a substantial proportion of all teachers had quite a lot of experience in industry (10 years or more), much of it was many years ago. It is noteworthy that in this survey, and in the PSI survey done for us, there was virtually no evidence of any movement from universities or polytechnics into industry."

* Colleges of Advanced Technology

It is clear from the career histories described in the Finniston survey, that the majority of those now teaching in British universities who left industry to read for a higher degree never returned to industry; they stayed on to do research and ultimately to become lecturers. There is some evidence of a small flow of people from public service jobs into teaching establishments but it is not likely to have significant impact. (The PSI survey suggests virtually no movement the other way.)

The Institution of Electrical Engineers published a salary survey of 4590 members in 1980 and a further salary survey of 3309 members in 1982. This survey was stated to be statistically valid to confidence limits in excess of 95%. Part of the survey describes the deployment of Associate Members, Members and Fellows (analysed by major professional groups and age) in universities and equivalent institutions.

By analysing the survey results, conclusions can be drawn about changes between 1980 and 1982. These are detailed below:

1. The population of university staff between the ages of 29 and 59 was approximately constant.

2. The intake to university staff of higher degree graduates per year is sufficient to meet losses by retirement from any cause. Finniston's research shows also that there is virtually no movement from universities or polytechnics into industry. Hence there can be little movement from industry into universities of older engineers, other than to meet expansion (if any).

3. It follows that once expansion of university staff stops, and if present trends in recruitment continue undamaged, university needs will be met from intake of people below 29 years of age.

4. It is unlikely that a higher degree graduate 29 years old or less, could have obtained "substantial" industrial engineering experience at any responsible level.

5. Since more than 90% of professional engineers operate in commerce and industry such experience is vital to engineering education.

Australian evidence clearly shows the very strong preference for higher degrees for engineering lecturers. It is submitted that there is a danger of a reduction in the relevance of teaching to industrial requirements.

Academic salaries in Australia make movement from industry to educational institutions possible. The barrier, however, is the reluctance of institutions to employ engineers directly from industry without both higher degrees and research publications. This barrier also prevents a freer interchange between academic institutions, industry and government. Engineers with higher degrees do not generally enter mainstream engineering but tend to enter R & D (Aston 1977, pD12).

8. SUMMARY

Evidence indicates that the number of lecturers with substantial recent practical and relevant engineering experience is small and is dropping.

It is inevitable that highly qualified specialist lecturers who presently make up the majority of teaching staff will influence the engineering curriculum towards specialisation. The curriculum content now being taught in many institutions shows such trends. This conflicts with requirements of many potential employers, who tend to require generalist engineers with some commercial knowledge.

Many brilliant students remain at university and proceed to higher qualifications. Once these are obtained, they may be offered fellowships, lectureships and spend their careers at universities. Whilst their training might be very appropriate for research careers, it must be remembered that the need for quality researchers is rather better satisfied than the need for quality teachers of engineers for industry. Engineers who have reached senior levels in industry do not often return to study for higher degrees and are thus not usually eligible nor inclined to become lecturers. This prevents the transfer of accumulated experience which is so valuable to students, not only on the basis of transfer of facts, but from the point of view of adding relevance and interest to lectures and thus to learning.

This lack of industrial experience will have at least three adverse results:

- It will be more difficult for teachers to appreciate the need for changes in response to industrial needs.
- It will be more difficult for teachers to satisfy industrial needs, because they will sometimes lack sufficient first hand personal experience.
- Students will be taught more highly specialised material because the lecturer will naturally want to teach what he knows best.

The trend away from employing experienced engineers as lecturers has adverse implications. That there is a need to employ experienced researchers is obvious. That there is also a need to employ experienced engineers is euqally obvious to the employers of engineering graduates. What is being argued here is a more balanced policy than that being followed in many institutions at present.

Mobility between academic employment and industry is important. Academic salary structures do not appear to be a major barrier. Employment policies are and should be changed to attract senior engineers from industry into the academic profession and vice versa.

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CHAPTER 3

COURSE DEVELOPMENT FOR VOCATIONALISM

All of the papers in this chapter are from the CAE and TAFE sectors. There is interesting evidence here that people in both these sectors see their viability in the longer term in their ability to respond flexibly to changing community requirements for education and training. One is struck in many of these papers by the dynamism and enthusiasm shown by individuals and institutions, both in terms of exploring new working relationships with industry (Francis and Burns) and in transcending the presently rigid bureaucratic boundaries between TAFE and the colleges (Brooks). Ironically, there is also much evidence here about the lack of clarity in the differences between certain courses in both sectors - the Associate Diploma (UG3) is a case in point as it seems to straddle the TAFE-CAE interface. This award is the subject of most of these papers.

This chapter contains six papers which look at the development of courses for vocational needs in the CAE and TAFE sectors. Brooks argues elegantly for the possibility of pursuing vocational relevance in a CAE course by co-operating with TAFE for credit exemption and end-on training. Philp's paper asserts that CAEs are not meeting community/industry needs and he advocates a generalist Associate Diploma (UG3) with a specialist strand. Francis and Burns give a candid and interesting description of collaboration between a CAE and the mining industry to design such a UG3 in Administration (Mining). Adams and Morgan's paper discusses the use of a decision framework to develop courses in an agricultural college, and describes their consultation with industry using a workshop technique. Clark describes the development of an Associate Diploma in Industrial Instrumentation, taken by external study only, in response to industry's articulated need for retraining. In this case a CAE's potential for flexibility has allowed it to accept a trade certificate as entry qualification, but O'Leary's paper is written within the atypical context of Canberra and his TAFE course can stipulate Year 12 as an entry pre-requisite. This final paper offers both an account of the development of a course in the 'grey' area between TAFE and the college sector, and a depressing insight into the manner in which educational issues can get crushed between bureaucratic imperatives.

ENHANCING VOCATIONAL RELEVANCE THROUGH CO-OPERATION BETWEEN SECTORS: A COUNTRY COLLEGE INITIATIVE.

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"Vocational Training" is a term which has undergone several metamorphoses since the medieval European universities devised training programmes for those called to a vocation in religion, medicine or the law. A decade ago the Colleges of Advanced Education were being encouraged to meet perceived vocational training needs in industry, while the early eighties have seen the torch of vocational relevance passed to the TAFE colleges. Before long, no doubt, Senior School Colleges will be asked in turn to shoulder the responsibility for providing living skills, relevant instruction and real world insights.

In short the trend since the Martin Committee Report has been to spawn new sectors within the educational bureaucracy to provide ever more allegedly relevant vocational training. The sectors operate within their own distinctive legal parameters, have totally different accreditation procedures, have their funding priorities defined by separate Federal Councils, and show scant inclination to collaborate in achieving co-operation and economies of scale in vocational training. Among the few things they possess in common are political environments contrived to encourage duplication of effort, parochial blinkers and a gross mismatch of educational opportunity between the major cities and the rest of Australia.

Although lip service is frequently paid to the concept of education for life, or so-called "end-on" education, little explicit attention has hitherto been paid to the transferability of credit for courses completed within each of the sectors. Allegedly separate but equal, the universities clearly perceive themselves to be more equal than Colleges of Advanced Education. At the bottom of the hierarchy, somewhat like the Holy Ghost in the Trinity, lie the Technical Colleges with their distinctly shadowy status in the pecking order.

This paper addresses itself to the urgent need for a more elegant and streamlined structure of vocational training in Australia. In particular it focusses upon possible models of co-operative education between the CAEs and TAFE. Two models are advanced, both in process of development at Riverina CAE, which may be especially advantageous in the rural hinterland regions of the country.

The first model is that of sequential progression from various TAFE Certificate awards into CAE associate diploma or degree courses. In common with most other Colleges of Advanced Education in NSW during the 'seventies, Riverina gave scant credit or advanced standing for courses completed in TAFE. For example the Bachelor of Business programme in Accountancy required enrollee holders of Technical and Further Education Commerce (Accounting Procedures) Certificates and Members of the Institute of Affiliate Accountants virtually to begin at the beginning alongside HSC school leavers and other unqualified entrants. Academic staff in the CAEs were reluctant to equate TAFE studies with advanced education credit courses; and in respect of Accountancy and similar senior disciplines there was the additional sensitivity or fear of being accused of diluting College programmes whose graduates stood to gain substantial (and lucrative) professional recognition.

Yet at the same time Colleges were happy to enrol significant numbers of mature-age students with vastly different individual background, academic and professional qualifications, and work experience. The same Colleges were actively encouraged by Government to adopt entry requirements much more "flexible" than those traditionally customary in formal studies at University level. As early as June 1969 the Commonwealth Committee of Inquiry into Academic Awards in Advanced Education had pointed out that "an accepted criterion for admission to a course in the Colleges is the production of evidence that a student can undertake it with reasonable likelihood of success." The question however, no less relevant today than in 1969, is what constitutes such "evidence." Furthermore what should a mature-age experienced College student have to demonstrate at enrolment time in order to gain a head-start in a course designed for both ordinary and mature-entry students possessing no similar background of study or work experience in the chosen field?

These questions become increasingly pressing as Colleges are ever more strongly urged to view favourably the so-called late developers, those people who might have left school early because of personal or domestic circumstances rather than scholastic deficiencies, but who subsequently seek to make up the lost ground after years of wandering in education byways or relatively low level, sub-tertiary institutions.

By the end of the 'seventies Riverina College was exploring ways of giving a head-start to such students without jeopardising the professional recognition which a Baccaleurate degree in Business can offer. For example its graduates in Accountancy are admitted to the Professional Orientation Programme of the Australian Society of Accountants and are eligible to apply for registration by the Public Accountants Registration Board and the Tax Agents Board without further examination. They are also allowed to enter the professional year of the Institute of Chartered Accountants under similar conditions. Graduates are also entitled to a number of exemptions in subjects required for membership of the Institute of Chartered Secretaries and Administrators, while the course is also recognised by the Bankers Institute of Australia.

Any initiatives therefore to widen the range of exemptions based upon TAFE Certificate study required careful consultation with the professional bodies and the State accrediting authority, the Higher Education Board of New South Wales. Following informal approaches by Riverina, in July 1979 the HEB held a meeting in Sydney attended by a number of Colleges offering Accountancy programmes. Each College was invited to indicate its policy regarding credit exemptions for members of the Institute of Affiliate Accountants, and Riverina responded with a scheme for granting provisional advanced standing of 28 units in the 90 unit B.Bus. programme.

The concept of provisional exemption proved to be fundamental to the success of the scheme as it eventually evolved. The normal practice when credit exemptions are requested by a student claiming that previous studies justify short-circuiting various parts of the later course, is for such exemptions to be granted from the moment of approval of the request. In many Colleges such approval can count for as much as half the workload in the later programme. In other words a student can gain half a degree without any work additional to that completed in the previous institution(s).

However should the student subsequently migrate to another course and/or institution, perhaps immediately after such exemption is gained, the bonus points could in principle then be carried forward and credited against the requirements of the following course. In other words the credit could become portable educationally and geographically, with risks somewhat analagous to those associated with laundering money via international transactions.

This practice seemed particularly inappropriate in the case of TAFE Certificate holders seeking to gain maximum possible credit for proposed studies at degree level in a particular College of Advanced Education. The eventual Riverina model for example was based on the premise that a precise subject-by-subject equivalence between Certificate and Baccaleurate studies was fraught with difficulty. Although much of the degree content might well have been studied at the lower level, the detailed equivalence was often shaky and it was not the College's intention to argue that the individual TAFE subjects were each identical with specific College subjects. Partly for this reason it was envisaged that only those who had completed their studies with TAFE would be eligible for head-starts; those who had done only part of the earlier course would be ineligible for consideration. The Certificate was seen as a package, whose total value could be equated broadly but not precisely with the first-level set of subjects in the degree course.

The solution therefore was to offer Certificate holders the opportunity - in broad terms - to enter the second level subjects directly. Although no definitive credit was granted at that stage, if the leap frogging ultimately proved successful then self-evidently the student had been competent to go straight to more advanced work. Any gaps or deficiencies caused by the lack of precise match between first level College subjects and TAFE Certificate studies could hopefully be overcome by special tutorial assistance; but the students were left in no doubt that they had to complete all the higher level subjects successfully before they could gain a degree. Only at that final stage, when they had completed all necessary studies at Riverina College, was the original provisional credit "confirmed." Should a student withdraw before completing the degree, the only formal exemptions claimable elsewhere would have to be based on the subjects specifically gained at Riverina College itself.

Quite apart from this, perhaps the major advantage with this scheme (at least in theory) is the perceived "double advantage" it gives students who persevere and stay in the system. To withdraw before completion automatically means forfeiting the provisional exemptions. It also means, of course, that students have to stay with Riverina College to complete the award if no similar preferential arrangement obtains elsewhere.

On the 23rd April 1980 representatives of the College met officers of the Australian Society of Accountants, the Institute of Chartered Accountants, the Institute of Affiliate Accountants and NSW TAFE in Sydney. The provisional exemption model was received with general approval and the two senior professional bodies were satisfied that standards and status were adequately protected. The discussion also established that many potential students within the greater Sydney Metropolitan region would stand to benefit if Riverina were given a franchise to offer the degree by correspondence. In June 1980 the Institute of Affiliate Accountants referred "with pleasure" to escalation becoming a reality in NSW. In this context the Executive Member of the NSW Higher Education Board and Chairman of its Courses Committee, Dr Peter Martin, issued a statement summarising the up-grading arrangements currently proposed by Riverina, Mitchell and Northern Rivers Colleges together with the NSW Institute of Technology.

As far as Riverina was concerned, the essential object was to give the 16 year old early school leaver who had thereupon enrolled in a four year part-time TAFE course an opportunity to transfer to degree studies with comparable status to the 18 year HSC holder who, two years earlier had proceeded to study accountancy part-time at College. Both such students, at the age of 20, would have completed roughly one-third of the Degree via part-time study. As mentioned above it was intended that the degree course to be followed by TAFE Certificate holders would be structured so that professional and disciplinary perspectives would be added to the technical competence previously acquired. In short the arrangement was designed to break down entry barriers, perceived and actual, yet maintain - and be seen to maintain- the standards expected of UG1 graduates.

It is too early to assess the full value and potential role of this model course in Accountancy. Interest has been high and enrolments have remained between 50 and 100 per year, although the attrition rate has generally been higher than expected or desired. Preliminary evidence suggests that the major problem is the workload upon the students, who are generally in their twenties and fully employed professionally following their IAA status.

A particularly interesting development of the future will be the computerisation of Accountancy programmes in TAFE and advanced education alike. Many of the new software systems are likely to be common to both sectors, and economies of scale imply convergence rather than divergence of the accountancy programmes taught in the two institutional sectors. Other things being equal, this trend might ease the transition from TAFE to CAE studies and promote higher retention rates.

By the close of 1982 the College considered the experiment had been sufficiently fruitful to extend it to the B.Bus. in Administration, which is also offered (mainly via correspondence) by the School of Commerce. The original proposal was to provide head-start for students who had completed the TAFE Management Certificate course, and in November 1982 a preliminary sample was surveyed at 10 country and small metropolitan TAFE Colleges. Final year students enrolled in the Management, Public Administration and Personnel Administration courses were invited to complete a short survey form and indicate any interest in the exemption model proposed by Riverina. Some 43 replies came from students at the 6 colleges which responded, and with 88% of a positive nature expressing interest in the proposed course the College felt the proposal worth implementing.

Thus from the beginning of 1984 holders of the TAFE Management Certificate have had the opportunity to upgrade their qualification in the same way as previously outlined for the Accountany programme. Provisional exemption is available in 7 subjects, leaving an additional 17 subjects to be completed to meet course requirements. Holders of other TAFE Certificates such as Personnel Administration and Public Administration, and the Certificate of Business Studies (Personnel) are also eligible to be considered for specified provisional exemptions under the conversion scheme.

The second end-on model being developed by Riverina is that of a genuinely co-operative or joint programme in which an associate diploma course might actively subsume a TAFE Certificate programme. Such co-operation could take the form of either pre-requisite or concurrent studies, and the College is currently developing a model of specialist stranding of associate diploma courses which may facilitate the incorporation of industry-specific TAFE components within the tertiary credit course. The details of the UG3 model are described in the paper by Dr N.E. Philp which is being separately delivered at this conference. In essence it seeks to tailor vocationally-specific programmes via a combination of carefully selected subjects from the College's general portfolio plus a set of subjects actively developed in association with the industry and/or professional groupings to which the course relates.

However at Albury-Wodonga the College has a small but rapidly developing Campus which functions in close proximity to a large and highly successful TAFE College. As part of the Growth Centre brief, Riverina has been encouraged to collaborate closely with the other major post-secondary educational providers, including TAFE both at Albury and Wodonga. It is now seen timely to consider active collaboration in the development of associate diploma courses which might build upon and actually subsume completed courses (or those close to completion) at the Certificate level.

Towards the end of 1983 the Commonwealth Government suddenly announced that some 40 places for so-called Disadvantaged Students were to be located at Riverina's Albury-Wodonga Campus. Disadvantaged in this context includes women who have found it difficult to proceed to higher levels of management responsibility because the secretarial courses traditionally available to females end in a vocational cul-de-sac. This is particularly evident among the many girls who traditionally proceed to shorthand and typing courses but rarely thereafter gain the opportunity to learn and exercise significant management skills.

Albury Technical College had offered the Advanced Secretarial Studies Certificate course for some years, and it therefore seemed appropriate to negotiate a provisional credit entry scheme whereby Certificate holders (overwhelmingly female) might be able to proceed to an Office Management course at the UG3 level. The proposal is still in its infancy, but the College currently proposes to offer an Office Management course in 1985, subject to NSW Higher Education Board approval. For both ordinary and special admission categories it is intended that completion of a TAFE Secretarial Studies Certificate would be required, but those students who had attained the Advanced award might be admitted with provisional exemption for up to 50% of the course (8 subjects or one year's equivalent full time study). The proposal is somewhat complicated by current moves within TAFE to modify the conditions for award of both the Secretarial and Advanced Secretarial Certificates, but the College still entertains the possibility of also giving a measure of head-start to those with the lower award - who might concurrently then proceed via bridging work within TAFE to repair any technical skills deficiencies. In other words a conjoint programme of post-Certificate study.

In summary the College is hopeful that a UG3 programme can be fashioned which would involve no more than one year's equivalent full time study on top of the earlier work done in TAFE. As with the Accountancy and Administration programmes sketched earlier, the status of the award would be protected by students having to complete the more advanced subjects. But in this case much of the professional and vocational skills component, as envisaged in the general UG3 model being pioneered by the College, would be supplied by the TAFE studies themselves. Riverina College itself would not attempt to offer such technical professional studies, but instead rely upon TAFE to provide the necessary skills ingredient, e.g. typing and at least introductory word processing. The College's role would be to build upon such skills via the erection of higher order competencies in industrial law, personnel management, computer applications and office management generally. The co-operative course model is seen as particularly timely in view of rapid advances in both office technology and office ergonomics. Traditional secretarial training will soon be out-distanced by the need for new skills whose execution will go to the heart of management efficiency.

So far Office Management is the first cab off the rank, but another exciting possibility might lie in the field of robotics where the engineering skills taught at TAFE might be complemented by computing skills taught at Riverina CAE. Such models (which could also be offered via innovative distance teaching) offer significant economies of scale for educational producers as well as optimise career opportunities for educational consumers.

Looking further ahead such models appear compatible with networking arrangements and collaborative programmes between institutions geographically remote from one another. In 1983 the Riverina School of Commerce began to explore the possibility of a collaborative training programme between the NSW Police Academy and the College. In May 1984 the Academy will take over the former Goulburn Campus of the College, and tentative thought has been given to combining the traditional training programme of the policeman (weapons training, say, or court procedure) with some of the sophisticated skills necessary to combat organised crime (computer audit, taxation law and corporate fraud). Police training schemes, or for that matter many similar industry-based training programmes, could in principle be conjoined with advanced educational programmes with benefit to all parties. In other words the Colleges of Advanced Education would consciously build upon vocational skills programmes which, left to themselves, might limit career opportunities for the participants. At the same time Colleges would not seek to replicate anything already being done satisfactorily within the industry training context, while the deliberate fashioning of co-operative educational programmes might hopefully break down the entrenched institutional barriers which so often make "education-for-life" an obstacle race.

What seems clear is that advances in distance teaching via computer-based information access during the next decade will facilitate both inter-State and inter-sectoral networking. Distance teaching via the traditional correspondence packages may soon be a thing of the past, with students individually locking into distant college resources (i.e. data banks) via personal computers and telephone modems. Specialist vocational centres of excellence may ultimately take the form of a geographically dis-aggregated polytechnic with outlets across the Commonwealth and (in many cases) away from the metropolitan conurbations altogether.

This invites the prospect, to coin a phrase, of the educational consumer becoming king. If indeed students gain increasing freedom to shop around for programmes which suit their particular needs and interests at a given stage in their careers or life cycles, the educational providers will have an incentive as well as a responsibility to tailor courses which optimise the study opportunities of their student markets.

Such a prospect has its dangers as well as its positive features. Without a concern for standards, shopping around for the cheapest package could endanger specialist high-quality outlets. While Riverina College is totally committed to the concept of vocational relevance, it is equally firm that relevance is fully grasped and appreciated only during the long haul of study. The educational models discussed above are conceived as summative, placing progressively greater intellectual demands upon those seeking entry to the higher-order elites of the labour force. Such credit exemption and end-on models are a little like camps on Mount Everest. Students advance from their struggles in the foothills and steadily acclimatise to the more searching demands of higher and higher studies. But the final slopes still have to be conquered and it is not the College's purpose to debase their ultimate severity.

A FLEXIBLE MODEL FOR THE VOCATIONAL EDUCATION OF PARA-PROFESSIONALS BY COLLEGES OF ADVANCED EDUCATION*

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NEEDS, DEMANDS AND A GENERAL PHILOSOPHY

If one's inferences from the published educational statistics of recent years (1) can guide us, it appears that within this state (New South Wales) only approximately 27% of Year 12 students proceed immediately to a university education on the completion of their secondary schooling. Another 15% or so enrol in courses offered by the state's Colleges of Advanced Education. A significant proportion of HSC students do not qualify for admission to any existing higher educational course and a number who do often defer their enrolment for a year or two. A further, and currently large, number of students desire to attend a university or college, have entrance qualifications that would have gained them admission in earlier years, but have missed out as a result of current quota limitations. However, it is with yet another sub-group that this paper is primarily concerned. From any given HSC cohort there remains a significant number who have, in fact, attained the minimum entrance qualifications for tertiary courses but who instead choose to forgo a full-time higher education. In recent years there appear to be as many school leavers in this particular category as there are in the more publicly apparent sub-group who proceed directly to one of the state's CAEs (2).

The CTEC study of Education and Employment Opportunities for Young People (1982) draws attention to the fact that the proportion of Year 12 students not planning to enter higher education is now increasing. Furthermore, the study notes that, "the decline in transfer from school to higher education has been most marked amongst students with relatively high levels of ability" (p. 70).

As tertiary educators we must address ourselves to the question as to why such a large and increasing proportion of academically capable school leavers prefer (at least initially) to do without what we currently have to offer. In addition we must consider that equally significant group of students whose tertiary aspirations have been initially thwarted and who may come to us later rather than sooner.

There is evidence that HSC graduates of the type described are relatively successful in their quest to enter the labourforce and tend to displace or out-compete other less educated adolescent job seekers. Many seek and find employment in the rapidly expanding service (or, tertiary) sector of the economy. They enter careers in such areas as banking and finance, public health, telecommunications, tourism and recreation, life and general insurance, real estate and property management, etc., or in one of the many departments and instrumentalities of local, state and federal government. Within these particular industries and also within manufacturing, the successful HSC graduate tends to occupy the higher level clerical and the mid-level managerial positions. Some of them return to traditional college and university courses, take degrees and may subsequently rise to the ranks of senior management. For most, however, further vocational training seems to be limited to on-the-job training, short courses at industry training schools or, where appropriate and available, an evening course at a nearby TAFE college. They form the broad stratum of para-professional manpower within one of the most rapidly growing sectors of the economy.

Despite a vague recognition of the considerable size and expanding nature of this para-professional manpower category, the Advanced Education (College) sector appears to have done little to provide an appropriate mid-level form of vocational training through its existing course profiles. The vast majority of our courses attempt to replicate in both content and level the degree patterns typical of most Australian universities and there is often only token recognition in CAEs that a degree and its formal university style of education is not to everyone's liking. To quote a more enlightened educationalist:

> The university road is not, however, for everyone and when one is seeking for alternative pathways one is looking for programmes which are occupation based rather than subject based, applied rather than theoretical, criterion referenced rather than norm referenced, skill based rather than ideas based, programmes which emphasise know how rather than know that. (A.M. Ross, 1981).

Former HSC students who choose not to follow the traditional pathway of a university degree and who swell the ranks of para-professional manpower are, I suggest, likely to express their educational needs in terms similar to those recognised by Professor Ross. Along with the overwhelming majority of the Australian workforce, they have initially sought the less formal pathway to learning that comes with general work experience and on-the-job training in the well known "school of hard knocks". If and when they seek to formalise and extend their education or are encouraged to do so by their employers, they are likely to have reached mature-age student status. They are also likely to prefer courses that they perceive to be highly relevant to their chosen vocations, be somewhat shorter in duration than the degree courses they were once to forgo, and to be offered by the part-time or external correspondence mode. This latter facility enables them to remain fully employed and to capitalise on the work experience status that they gained through entering the workforce directly from school.

An occupationally-specific, practically-oriented and technical form of post-secondary education is usually provided through industry-based training schemes or the TAFE sector. However, such specific forms of vocational training have a number of limitations. Firstly, vocationally specific skills are more thoroughly learnt and understood if they are able to expand from a more general (i.e., theoretical) base. For example, specific aspects of laboratory management are best understood in relation to the general principles of business administration. Also, in an increasingly sophisticated and complex workplace, occupationally specific skills (and indeed workers themselves) can rapidly become redundant. One needs, therefore, a broader base of general, albeit vocationally relevant, education if one is to have the vocational flexibility to adapt and retrain in the face of such incessant technological change.

There is thus a definite need to blend the vocationally specific knowledge and skills with more liberalising elements of education. "Courses should be designed as a preparation for working life and should encourage students to develop analytical skills and the ability to cope with change" (AEC, 1982, p. 10).

CURRENT COURSES AND PROCEDURES: THEIR LIMITATIONS

The Associate Diploma (UG3) courses offered within the Advanced Education sector are appropriate in level for the training of para-professional manpower (especially those who have had the equivalent of a full secondary education). They are generally of short duration (2 years full-time equivalent) and usually are of a distinctly vocational flavour. Surely, the raison d'etre of the Advanced Education sector must be questioned when it is considered that by the early 1980s fewer than 6% of all CAE enrolments were in such Associate Diploma courses. Furthermore, only a very few of these courses were available by teaching modes which suited students who wished to earn and learn concurrently.

Those Associate Diploma courses that are offered by colleges are usually well-regarded and are indeed meeting industry and community needs in a fairly restricted range of vocational areas. However, because of the very long lead-in period required to initiate a specific course and the rather cumbersome accreditation procedures employed by the New South Wales Higher Education Board, there has been little incentive for colleges to develop the very large array of subject-combination (courses) necessary to cover the diverse needs of all service sector industries. Indeed, such formal proliferation of separate courses would be most undesirable in times when restraint or controlled growth is called for. Furthermore, it is quite difficult to scale down or phase out courses when the bulk of needs have been met or to be able to revise courses promptly and effectively to better suit the changing needs of an industry if and when this is required.

A large part of what I see as a current mismatch between industry need and existing college courses is not so much that the CAEs lack a sufficient array of quite relevant subjects (3) but rather that existing degree and diploma structures tend to prevent the most appropriate package of subjects from being tailored to meet each particular vocational need. The "fixed menu" of a degree often means that certain subject areas are pursued to unnecessarily advanced levels and/or in inappropriate directions. As a consequence other subject areas, often more attuned to the particular vocational needs and levels of para-professionals, are omitted.

There is a need to disaggregate existing courses and to re-offer their components in (often) shorter packages more in keeping with expressed industry needs and to offer them in modes that are more accessible to the people who are seeking them. If the most appropriate package of subjects is to be selected for each particular industry's training needs, a much more flexible form of course structuring is called for. Such flexibility should also be accompanied by a greater industry involvement in all aspects and at all stages of course design and subject unit selection. A switch from supplier-initiated to demander-initiated course design is long overdue, particularly at this level of vocational education.

There also needs to be much greater flexibility in utilizing and giving credit for units of study undertaken at other institutions. If this were so, the considerable diversity of subject offerings available throughout the entire post-secondary sector would almost certainly ensure that finely tailored packages could be developed for the most exacting of vocational training needs. Unfortunately, the current tertiary funding arrangements are incompatible with such an initiative and, no doubt, administrators will be aware of the many other constraints and pitfalls associated with cooperative ventures. With sufficient goodwill the problems are not insoluble.

CAEs by themselves are not always in the best position to provide the very industry-specific and practical aspects of a course but they are ideally placed to provide the more "general but vocationally relevant" component. They also have the expertise and facilities to organise courses which blend the more general with the vocationally specific aspects of a well-balanced, mid-level form of vocational education.

The basic contention of this paper is simply that, for training certain classes of personnel, a two-year (full-time equivalent) general but vocationally-relevant tertiary education which accompanies and complements a vocationally-specific and practical component may well provide a more appropriate and attractive course of vocational training than is currently offered through existing degree and diploma structures.

A PROPOSAL FOR A GENERAL COURSE

A general course proposal embodying the flexibility I have indicated has now been incorporated in the planning documents of Riverina College since early in 1982. The proposal has been aired with the Higher Education Board and appears to have its tacit support. However, because UG3 courses (and particularly those of a distinctly vocational nature) sit uncomfortably at the TAFE/CAE interface, the proposal is unlikely to receive TEC approval and funding until the respective roles of the two sectors regarding such courses are adequately defined. However, by making permissible modifications to our already approved UG3s in Administration and Agriculture, Riverina College has been encouraged and able to initiate four successful vocational strands - Laboratory Management, Mining, Community Services and Plant Protection. Industry interest, cooperation and involvement in the design and implementation of these courses, especially in the preparation of the vocationally specific course units, has exceeded our expectations. The experience has clearly indicated the potential of the model for meeting expressed industry training needs in a number of areas.

Perhaps the time has now come to dispense with subterfuge and to seek explicit accreditation for a flexible and general model apposite to this mid-level form of vocational education. I would like to see approval given to the general philosophy and the broad structural parameters embodied in designing strands for a generalist "Associate Diploma in Tertiary Studies (Strand Title)". Specific strands or "packages" that are assembled could then be introduced with minimum delay, revised promptly if needs change and phased out without major disruption if and when a particular demand starts to wane. This general model may well be appropriate to a number of multi-purpose colleges within the Advanced Education sector. The particular specialist strands developed by any given institution would depend upon its existing course profile and its capacity to offer a high proportion of the needed units by appropriate teaching modes.

The general course pattern and course requirements would replicate those which currently exist at RCAE with respect to the four existing strands of the Associate Diploma in Administration, i.e.:

- The course consists of 16 one-semester subjects and is usually taken over a period of 8 semesters (or, 4 years part-time study).

- It is to be offered by the external correspondence mode and may require attendance at a number of residential schools throughout the duration of the course.

- Entrance requirements may depend upon previous technical qualifications and work experience or upon HSC (or equivalent) status. Such matters are decided in close liaison with the industrial body associated with the course design.

- These are some broad structural parameters (which, to date, have not proven to be unduly restrictive to either the College of the industry). A course will consist of:

  (a) Four "foundation" subjects (25%): There are eight general subjects written specifically at a UG3 (sub-degree) level from which any four may be chosen (prescribed) for a particular strand. These are the "liberalising elements" of a vocational education and are intended to develop the broader skills, knowledge and attitudes required to cope with change. Being written at a sub-degree level and offered early within each programme such subjects also serve as a bridge between secondary and tertiary study for those readjusting after a sometimes long absence from study habits. The eight subjects from which the choice is made are: Communication; Computers and Computing; Introductory Administration; Methods of Social Investigation; The Impact of Ideology and Technology; The Australian Society and Economy; The Australian Government and Law; and An Introduction to the Behavioural Sciences.

  (b) Eight semester subjects of a "general but vocationally relevant" nature (50%): These are selected from existing College courses. They will relate to the specific nature of the strand and be selected by industry and College personnel in consultation. A stipulated number of subjects will have to be at a second-year level or higher. Because most of these subjects will come from existing UG1 courses, they provide the opportunity for the more academically capable students to transfer to degree level study (and claim appropriate credits) if they so desire. If more appropriate units are available in other than the host college, they too can be taken and credited in the course.

  Because the initial four subjects and the next eight (a total of 75%) can be selected "from the shelf" and thus require no new developments and few additional resources, the extreme cost effectiveness of this initiative can be appreciated.

  (c) Four "vocationally specific" subjects (25%): These subjects are selected or designed by the particpating industry (through its professional body or consultants). They will normally be prepared by industry training officers or others recommended as having expertise in the specific vocational areas. In some cases existing college or TAFE courses may be quite appropriate. College staff and facilities will be used to assist in the coordination, preparation and tutoring of these subjects although, hopefully, greater long-term college-industry interaction may see industry assistance with the financing of such units (in funding journals, books, equipment, computer software, etc.).

CONCLUSION

The Advanced Education sector is called upon to respond to quite a diverse range of community needs and vocational aspirations and it is rightly expected that this response be rapid and effective. Whilst "higher" education is, by definition, a path open only to those who have been genetically blessed, it is perhaps time that the particular post-secondary sector created to provide for society's broader educational needs directed itself more closely to that task. Intellectual life still exists at a sub-degree level. Large and increasing cohorts of academically capable, mature men and women in sub-professional manpower positions are currently being denied a style and level of tertiary education consistent with their vocational aspirations. A rapid and effective response to such a diverse range of vocational needs would, however, require considerable flexibility in course design and a more cooperative and flexible approach to the intra-sectoral and inter-sectoral provisioning and crediting of course units. It would also call for a more flexible and generous attitude towards funding by the funding authorities. The model suggested in this paper may, at least, contribute to the planning task.

NOTES

* The views expressed in this paper are the author's and should not in any way be interpreted as implying the official position of Riverina CAE.

(1) For example, in 1981 there were 28,411 students in Year 12 in NSW schools. In 1982, 7,600 students entered university courses in state universities following the HSC of the previous year and another 4,280 entered the NSW CAEs on the same basis. Source: ABS Catalogues Nos 4202.0 (1981) and 4208.0, 4206.0 (1982).

(2) The assumption is that approximately 60% of Year 12 attain a minimum tertiary entrance aggregate mark (i.e., approximately 240) or better.

(3) For example, Riverina CAE currently offers approximately 600 different individual subjects. When we consider that there are at least 23 similar or larger multi-purpose CAEs in Australia, the total array of subjects being offered within the CAE system should be sufficient to meet every conceivable industry training need.

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JOINT INDUSTRY AND EDUCATIONIST DEVELOPMENT OF A TERTIARY-LEVEL COURSE FOR MID-MANAGERS IN THE MINING INDUSTRY

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A unique associate diploma for mid-managers in the mining industry is being jointly developed by personnel from the industry and a College of Advanced Education. While this relationship has revealed some difficulties, it has also emphasized the need for a close working relationship if worthwhile benefits are to accrue to employee, employer and educator. This paper will, for convenience, examine the developmental stages of this tertiary-level course separately, but in reality the stages are interactive and interdependent.

Rationale

In most mining organizations there exists a middle management level whose functions include:

(a) Direct supervision of the work force.
(b) Provision of technical input to the operation.
(c) On-line decision making.
(d) Contribution to organizational development.

Traditionally, middle management positions in the specialist areas of mining and mineral processing are held by individuals with little or no formal training who have progressed "through the ranks".

The tasks involved in a middle manager's job are a complex combination of technical skills and managerial expertise. Middle managers hold a pivotal position in any mining operation since they provide the link between the work force and senior management. They are the people who must implement policy in both technical and industrial relations areas and therefore require training in two areas, which are usually regarded as separate.

The associate diploma which is the subject of this paper has a sociotechnical orientation: a concern with people and technology. The inclusion of both in an integrated approach aims to meet the needs of middle managers if they are to operate effectively.

Identification of Industry Need and Student Demand

Personnel managers, engineers, scientists and other professionals in the mining industry often deal with middle managers and aspiring middle managers seeking career development. As far as formal qualifications are concerned, these people can be advised to enrol in tertiary-level courses available through universities, colleges of advanced education or technical and further education. In many cases, however, these courses are not suitable for a variety of reasons, such as:

(a) Attendance is required at the institution on a regular basis. Even if employees live within commuting distance there may be problems of shift work, family responsibilities or social life.

(b) Generally, middle managers do not aspire to become professional engineers, scientists or accountants, but rather to improve their performance.

(c) While courses at sub-degree level are available in such areas as engineering, chemical analysis or administration, little is available in such areas as mining and mineral processing.

(d) Existing qualifications specialize in technical or managerial functions, and exceed the needs of middle managers in one area while offering insufficient depth in the other.

(e) Middle managers and aspiring middle managers usually have been in the work force for some years, have not engaged in formal study for some years, and may not meet standard entry requirements for tertiary-level enrolment, e.g., matriculation. Irrespective of admission status, however, they may perceive much of the contents of a course as irrelevant to their job.

Some companies, such as Woodlawn Mines who operate a "multi-skilling program", provide considerable on-the-job training for employees, with appropriate monetary and status rewards for achieving targeted skill levels. A proportion of the work force may consequently become enthused about further training, and both individually and through unions may bring pressure to bear on the company to extend training beyond the on-the-job level. Perhaps there is a growing appreciation of the difference between "training" in a narrow sense and "education" in a broader sense. In the case of Woodlawn Mines, it was agreed that an associate diploma, offered by a neighbouring College of Advanced Education and combining technical and managerial strands, was a satisfactory means of meeting the requirements of all interested parties. From the company point of view, such a course was expected to improve morale and productivity, while from the employee viewpoint there was promise of extrinsic and intrinsic rewards such as academic status and job satisfaction, plus associated benefits such as transportability.

Informal inquiry within the South-East region of New South Wales suggested that industry need and student demand were likely to justify the development of such an associate diploma. This speculation was tested more formally by a survey conducted through the Australian Mines and Metals Association in 1981. Of the responses received from the mining industry throughout Australia, ninety percent were supportive or very supportive. Unsolicited inquiries were also received by the College from other interested organizations. The validity of this response was operationalized in February 1984, when thirty-four students began their course. Of these, seven were from the Goulburn region and the remainder from the Northern Territory and all states in Australia except South Australia.

Design

After consideration of the background and needs of prospective students and with due regard to employee mobility within a widespread and geographically isolated industry, it was decided that an associate diploma through correspondence study would best meet requirements. The course design conformed with the "general structure" approved by the New South Wales Higher Education Board in 1983, and is an example of a growing number of courses which attempt to more efficiently meet the fluctuating needs of employment through flexible utilization of College resources. (N.B. Paper presented this afternoon by N.E. Philp: "A flexible model for the vocational training of para-professional manpower by CAEs"). The course has three parts:

(a) Foundation subjects: four subjects drawn from the bank of subjects approved by College Board and completed in the first two years of study. In order of study they are: Communications, Introduction to Behavioural Sciences, Impact of Ideology and Technology, and Introductory Administration. These subjects are not course-specific but a nucleus of subjects without which diplomates would be less well equipped to practise their vocation.

(b) Professional subjects: seven subjects from the College Register which are appropriate as professional education and training subjects for personnel in the mining industry. Four subjects are compulsory, being regarded as essential and/or basic to further study: Organisational Behaviour, Personnel Management, Introduction to Earth Science, and Introductory Physics. The other three subjects are elected from two groups, and enable students to tailor their course more to their own interests and circumstances. One group contains subjects in accountancy, administration, law and psychology; while the other group contains subjects in computing, geology, mathematics, physics and basic electronics. One or two subjects must be chosen from each group.

(c) Vocational subjects: five of six subjects must be completed according to a certain pattern. These subjects have been developed in conjunction with senior personnel from the mining industry, and with advice from professional associations. Some of the subject content has relevance for both "soft" and "hard rock" mining. The first two subjects in the sequence: Introduction to Mining Industry and Mining Operating Functions, provide an understanding of the place of the mining industry in a wider context and an introduction to all of the individual functions performed in a mining operation. Students must then choose to specialize in Mineral Processing or Mine Planning and Survey. The final two subjects in the sequence, Practicum 1 and 2, provide an opportunity to apply the principles of earlier subjects in a practical setting to demonstrate the satisfactory acquisition of technical and managerial skills.

In all, sixteen subjects are to be satisfactorily completed in a recommended pattern of two per semester over four years of part-time study by correspondence.

In developing the above design, a number of factors needed to be considered, including:

(a) The need to cover both technical and managerial aspects without reinforcing their traditional separation. While the course structure is less than ideal in this respect, the vocational subjects in particular have been especially designed through contents and sequence to achieve an integration. Overall, however, a heavy responsibility rests with the course co-ordinator and the subject teachers to operate within the philosophy of the course.

(b) The limits imposed by the "general structure" approved by the Higher Education Board. Ideally, every subject should have been written for the mining industry or have such an orientation. However, this course (in common with similarly-approved associate diplomas) had to conform to a set structure and restrict the number of tailored subjects.

(c) The responsibility for designing a course for a diverse and probably critical group of students who might have to be persuaded to broaden their horizons beyond their immediate world of work and be convinced of the relevance of some aspects of the course.

An associated difficulty of course development lay in the natural dichotomy of the design team which comprised technical and managerial professionals from the mining industry and college academics from a range of scientific and humanistic disciplines. While there was some disagreement within the industrial and academic sub-groups, there was an understandably greater division at times between the sub-groups, largely born of an ignorance of each other's "working world". To a large extent this was overcome through formal and informal contact. After a number of meetings during which the size and composition of the sub-groups varied, a more formal working party was formed on the recommendation of a senior manager from the mining industry. This working party of four from industry and four academics with the course co-ordinator as chairman, met monthly, kept minutes and adhered generally to standard meeting procedure. Papers were presented, differences were aired and resolutions reached. While such issues as the optimum balance of technical and managerial components in the course drew some debate, probably the greatest cause of dissension was the difference between what the industry wanted and what the College could accommodate. The more formal contact was supplemented by concurrent, ad hoc and less formal contact on campus, mine site and neutral territory. Academic staff enjoyed guided tours of the mine, had a working lunch on site, attended meetings in the conference room and had discussions with prospective students. One of the academic staff conducted an in-service training program for mine employees on site. For their part, the industrial members of the working party visited the campus regularly, had a guided tour of the library and enjoyed numerous "afternoon coffees" during formal and informal discussions. Some planned and chance social meetings also occurred and the course was a not-infrequent topic of conversation. Over time, personal relationships were established, a social network began to evolve, mutual understanding grew and a working relationship emerged. Each sub-group learnt more of the lifestyle and difficulties of the other in a process of mutual education. Without such goodwill and understanding, a workable and worthwhile outcome would probably have been impossible.

Assessment and Accreditation

Consistent with the joint industrial and academic approach to course development, accreditation was sought from the respective professional bodies. The most pressing task was to gain formal accreditation by the N.S.W. Higher Education Board and thereby seek National Registration by the Australian Council on Awards in Advanced Education. To this end, a specialist committee appointed by the Higher Education Board met on the Goulburn Campus in August 1983. The chairman was manager of commercial and industry relations of a large Australian company, assisted by a senior inspector of mines from a state government department, and a senior lecturer in geology from a tertiary institution in Sydney. The committee's composition was deliberately chosen to provide representatives from senior management, the mining profession and tertiary education. After an examination of the documented course proposal; inspection of the campus facilities; and discussion with administrative and teaching staff from Wagga Wagga and Goulburn campuses, including the co-authors of this paper, the committee resolved "to recommend to the Board that the proposed Mining strand of the existing Associate Diploma in Administration be approved without conditions, to commence in 1984". Several suggestions were also made for consideration of the College, concerning the title and nature of the award, and the subject content. After consideration by the College, all of these suggestions were adopted and the Higher Education Board informed in September 1983. The course was entitled: "Associate Diploma in Administration (Mining)", and was one of several strands developed by the College in 1983 for different occupational groups.

The Australian Mining Industry Council in Canberra and The Australasian Institute of Mining and Metallurgy in Victoria have been kept informed of course developments since 1982. Both bodies have been supportive and a copy of the Higher Education Board Proposal was examined by the latter's Education Committee. However, the present requirement for admission to Corporate Membership of The Institute is "a course of study of a minimum of three years full time from university entrance level". It is hoped that professional recognition can be gained for graduates as they are able to demonstrate on-the-job achievement. It is regarded as a College responsibility to continue to seek professional recognition for the course from such bodies as The Australasian Institute of Mining and Metallurgy and the N.S.W. Coal Preparation Society.

Course Promotion

Course promotion began some months before student applications for admission closed on 30 November 1983. While the need and demand survey had provided a sample of the likely market, its exact location and means of effective contact were largely unknown. In an attempt to mount a successful campaign, a variety of avenues were explored:

(a) Within a limited budget, advertisements were placed in local, regional and national newspapers. Prospective students were invited to send names and addresses to the College for "further information and application forms".

(b) About one thousand brochures were printed. These were sent to inquirers and also widely circulated to advertise the course. Some were sent to union representatives and professional associations, others to mines listed in industrial publications and telephone directories, and yet others were placed in information centres and libraries. However, the largest single distribution was through an Australia-wide mailing by the Australian Mines and Metals Association.

(c) Brief course descriptions were placed in industrial periodicals.

(d) Media releases were prepared for local press and radio.

(e) Arrangements were made with management, for academic staff to be available on a local mine site for discussion with interested employees.

(f) The "grapevine" was used through colleagues in mining and allied industries, academic and non-academic members of College staff, current and ex-students of other courses, friends and acquaintances.

The response was heartening with almost fifty students submitting applications. Interestingly, one student transferred to the new course from a partly-completed degree in business studies. However, only thirty-four students finally accepted offers of a place in the course and began studies in February 1984. At the time of preparing this paper, the number of students had dropped to thirty-two. Such attrition is consistent with normal expectations. The market proved to be almost unpredictable: no students enrolled from South Australia, one from the Northern Territory, and fifteen from Western Australia including twelve from the one company, largely due to the enthusiasm of one of the management staff. With experience gained from the 1983 promotional campaign and a file of established contacts, future promotion should be more efficient and effective. However, this confidence must be tempered by the harsh reality of the marketplace, where "word of mouth is the best and worst form of advertisement." Almost certainly, the likelihood of a viable second intake of students depends on the evaluation of the course by the first intake.

Subject Writing

The three groups of subjects in the course structure varied considerably in the demands they made on subject writing. The Professional Subjects were already prepared; the Foundation Subjects could be modified at fairly short notice; but the Vocational Subjects were entirely new and had to be created. While academic staff were competent to modify the Foundation Subjects in consultation with industry, they did not possess the skills, experience or qualifications to prepare the subject content for the Vocational Subjects. Conversely, the contract writers from industry were unaware of the requirements of preparing suitable packages for correspondence teaching. Effective collaboration between "hard hats and mortar-boards" was essential, but difficult to achieve. Firstly, there were time constraints. Draft materials must be completed one full semester (about six months) before the subject is taught. Such lead time is necessary for conversion to the finished product ready for posting to students. Secondly, there are obvious difficulties in bringing contract writer and college adviser together at regular, and mutually convenient times and places. It is preferable for the adviser to be the potential subject co-ordinator who then has firsthand knowledge of the development of the package. In the absence of such collaboration, contract writers may suffer from a lack of progressive feedback which may be necessary for guidance and assurance. Any negative effects, such as frustration or anxiety, may be compounded by the dual demands of contract writing and fulltime employment. Thirdly, both parties may not readily agree on modifications to the material. And finally, the contract writer may "sub-contract" (as has been the case with the first two subjects in the sequence) and enlist the aid of colleagues in making specialist contributions. While this increases the specialist nature of the content it also introduces problems of fragmentation of content and consistency of style. These problems have meant added burdens for the subject co-ordinator and the Development Officer from the Division of External Studies who is ultimately responsible for producing the teaching package.

The first of the Vocational Subjects is in the hands of the students and the second is almost completed. The production of these packages has been a learning experience for contract writers and associated academic staff. It is hoped that this experience will improve the process if not the product of the remaining packages. A growing specialization in later subjects in the sequence should also reduce the need for a multi-disciplined team of contributors, although it will also impose a greater burden of writing on a smaller number of contributors. Perhaps the major lesson learnt so far is that if quality materials are to be produced, they are very time consuming and labour intensive, require the allocation of adequate resources, demand close collaboration between industry and College, and that this must be recognized by industry and College, writers, teachers and administrators.

Teaching

The primary responsibility for teaching must be and is accepted by the academic staff. However, the contribution of mining personnel is important: be it as consultant, guest lecturer or part-time tutor. This is particularly so during residential schools when firsthand and specialist contributions on or off campus add a direct link with industry. Accommodation and teaching facilities permitting, students can be assembled in proximity to industrial sites and benefit from guided tours, lectures, discussions, tutorials and displays, conducted by academic and industrial personnel. Ideally, the placement of residential schools should vary, not only to share the burden of intrastate and interstate travel time and overall costs, but to broaden and enrich the types of experiences gained by students (and staff!). Over time, "hard rock" workers can experience other metalliferous techniques, "soft rock" workers can experience "hard rock", both branches can experience allied industries, and other combinations of experiences can be organized. Clearly, such a program depends upon the goodwill and contribution of the mining industry.

On organizational and pedagogical grounds it is important for academic staff to act as subject and course co-ordinators. These reasons include:

(a) As the accredited body, it is ultimately the College's responsibility for the success of the course.

(b) Industrial personnel are mostly in fulltime employment and are usually unable or unwilling to accept the demands of sole responsibility for subject co-ordination. Understandably, College policy is for fulltime academic staff to play such roles, wherever possible. Certainly, it would be unreasonable to have students making direct contact with industrial personnel during working hours, whereas the College's Division of External Studies has been specially designed to cater for such contact.

(c) College staff are experienced educators and although sometimes lacking in industrial experience are capable of taking the major share of the teaching, particularly after a period of induction. Induction may be brief and self-initiated or something more formal and perhaps of longer duration.

(d) Any one subject or course is but part of a large number of subjects and courses offered to students. Only College staff are in a position to appreciate and act on this overall situation.

(e) The role of course co-ordinator demands almost fulltime devotion to a host of administrative and managerial functions. Implementation of course philosophy among a number of subject co-ordinators and teachers is but one example: albeit a particularly important and challenging one. In this course, an essential aspect of its philosophy is the balance of technical and managerial components, with due regard to the human factor.

(f) The nature of the mining industry is for staff and even enterprises to be transitory. Reliance cannot be placed solely on a local mine, for example, for contribution of staff or site access.

Staff development must precede and accompany course development. This may take the form of retraining of present staff and/or recruitment of new staff from appropriate areas of the industry. In many instances, existing staff have had experience in the private sector and have qualifications and skills applicable to industry. Geology, computing and psychology are but three examples. Retraining may thus build on such backgrounds. In other cases, however, retraining may need to be more extensive. While a policy of retraining and recruitment will increase the independence of the College, it may also lead to insularity and separation from the industry. A solution may be for secondment or temporary employment of staff from industry, and/or for academic staff to take leave for professional experience or be part of an exchange scheme with a view to maintaining firsthand contact with the industry and keeping abreast of change.

Evaluation

While it is too soon to attempt any serious evaluation of the course, it seems apt to conclude with a few comments on this important phase. The first cohort of students is enrolled and have submitted their first assignments. Already, there has been a loss of students between the number of applications for admission and acceptances of offers of a place in the course. Additionally, there have been two official withdrawals since the start of the Autumn Semester. While student attrition is customary, particularly at these early stages, such will need to be monitored and communication made with these students to ascertain reasons for withdrawal and also to identify possibilities of future re-enrolment. Students withdraw for a variety of reasons, some of which are independent of the course. However, it is important to gain feedback from students to try to rectify problems that are course-associated. Assessment of the first assignments provided some indication of the entry standard of the students and the quality of the teaching packages. The two lecturers concerned reported that the overall standard was satisfactory with some assignments being exceptional, and that the majority of students displayed a reasonable understanding of the industry in which they worked. These initial impressions were supplemented by a visit to two mine sites in Western Australia by one of these lecturers in April. His written report included the following observations:

> I saw no evidence that student enthusiasm for Communications was other than genuine. Several students volunteered accounts of how they felt their workplace understandings had improved dramatically as a result of doing the first assignment.
> Introduction to Mining was also praised highly ... The first assignment was regarded as practical, relevant and manageable. ...
> Students, especially isolated individuals, may need much lecturer support and contact, especially in the opening weeks of the course. This appears to be the period of most challenge to some students. One student, married, with children, stated that diploma study was taking all of his spare time. Another student, on the midnight to 8 a.m.

> shift, has not yet made a start to either assignment and may withdraw. The support of managerial staff for the student appears to be a key factor in student performance and attitude. (p.3)

These impressions should become more concrete over the semester through continuing assessment and further contact with students by mail, telephone or personal visit.

As the semesters pass, a variety of forms of evaluation is possible. Residential schools, for example, permit the administration of questionnaires or structured interviews, or allow staff to be sympathetic listeners. With annual student intakes, the enrolment pattern can be examined. Are the numbers increasing, decreasing or static? Do they reflect on the course itself, the state of the marketplace or other factors? How many of the first cohort graduated in minimum time? How many others are still actively enrolled? What of the remainder: how many failed or withdrew, when and why? What do the graduates think of the course? What do present and prospective employers, professional bodies and external moderators think of the graduates? How well have they realized the aims of the course? These are searching questions and valid answers may be difficult to obtain for some of them. But they should be pursued and acted upon where appropriate.

Students are a course's best or worst advertisement. Busy people will not persevere with a course unless it is perceived to be worthwhile. Nor will they "suffer fools gladly". It is essential to design a course for a particular industry in conjunction with that industry, to monitor student performance and be alert for "early warning signs". More formal and extensive forms of evaluation can be undertaken later in the course, but unless evaluation is begun early and employed constructively, there may never be a finished course to evaluate.

Conclusion

A unique course for middle managers in the mining industry has begun. It is an Associate Diploma in Administration (Mining) available by correspondence study, offering sociotechnical principles and skills in management training. Sufficient industry need and student demand have been established for present purposes and likely future prospects, at least in the short-term. The course design combines available College resources with specialist contributions from management and technical professionals in the industry. The course, or more precisely, a new strand of an existing course, has been recommended for accreditation by the N.S.W. Higher Education Board and thereby may gain National Registration by the Australian Council on Awards in Advanced Education. But it is important to also gain professional recognition by an appropriate industrial body, and this will be pursued. Course promotion attracted almost fifty applications from potential students, but a number of these did not accept the offers of enrolment. While such losses are customary, they should not be taken for granted. The promotional campaign revealed something of the nature of the market and the knowledge gained will assist future promotion. Subject writing has been a joint contribution from industry and academics, and a learning experience for both. Subject teaching and organization are accepted as the major responsibility of the academic staff, but in continuing association with industry. Staff retraining is an important aspect of subject writing and teaching. Course evaluation has already begun and early student feedback is encouraging. However, students are also experiencing problems. Some of these are course-related and efforts are being made to rectify them. Other problems are beyond College control, but are regarded sympathetically. Mining is characterized by a fairly mobile workforce, living in isolated areas and employed on shift work. For many employees, correspondence is the only possible mode of study. And these students need the support of College and employers if they are not only to continue their study, but to derive maximum benefit from it. The nature of the course and its clientele demands more than the standard academic package. Teaching staff must be prepared to demonstrate sociotechnical principles and effective management skills in their own relationships with students. Students and industry are "cost-benefit" conscious and will probably be harsh critics or staunch allies. It is the College's responsibility to ensure the latter.

Course development thus far has emphasized the need for a close working relationship between industry and academe if the best is to be gained for the student and for each other. The future of the course may well depend upon fostering this relationship.

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EXPERIENCES IN CURRICULUM DESIGN

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Dookie Campus,
Victorian College of Agriculture and Horticulture.

1. INTRODUCTION

The challenges of course development are considerable. When a new course is being devised or an existing course revised, the problem is to accommodate the demands of various parties with an interest in the course with the pragmatics of running the course, whilst maintaining sound educational concepts and practices. The revision of existing courses is complicated by the habits and prejudices which prevail within and outside the institution.

The Victorian Agricultural Colleges Act (1958) was amended in November 1975. A significant feature of this change to the legislation governing the Colleges was the deletion of curriculum prescriptions from the Regulations pertaining to the Act. Consequently each College was charged with devising educational programs in response to local and regional needs. The first task at Dookie was to re-design the Diploma of Agricultural Science course.

Recognising the conflicts which existed between the various groups interested in the College's courses, we sought assistance from the Higher Education Advisory and Research Unit at Monash University. A decision framework was devised and help in its implementation was provided. Paget et al (1976) have described the development and use of the framework, and in doing so assessed its usefulness.

This paper makes an assessment of the framework as it was employed in the revision of the UG-2 Diploma course in Agriculture at Dookie and in subsequent exercises, viz. the development of a UG-2 Diploma course in Horticulture at Dookie, the development of a TAFE middle level Certificate in Farming at Dookie, the revision of a TAFE middle level Certificate in Dairy Technology, and a review of the Primary curriculum for years P to 6 at a small rural school. In these differing situations, some of the limitations on the effectiveness of the framework have become evident and are outlined.

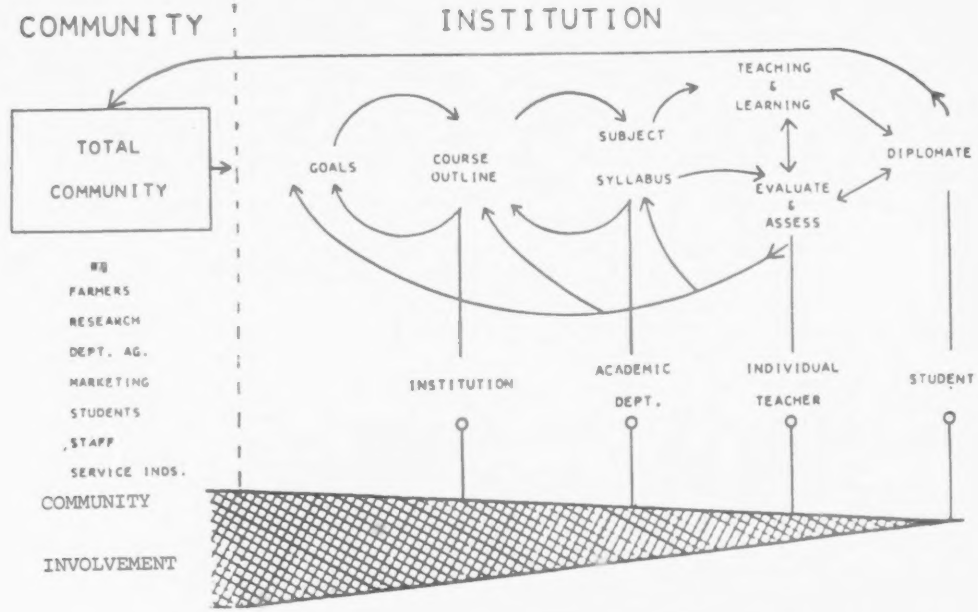
2. THE FRAMEWORK

The framework outlines the steps in the process of course development and review. Initially goals are determined. From these goals a course outline is developed. Component subject syllabi are derived. The details of teaching, learning, assessment and evaluation flow from the syllabus of each subject. This sequence is the core of the framework which is set out in Figure 1.

The framework indicates the most appropriate level within an institution for each stage of the process, differentiating the role of individual teachers, academic departments, and the institution.

Parallel to the levels within the institution, the degree of community involvement appropriate to each step is indicated.

Figure 1


COMMUNITY
INSTITUTION
TOTAL COMMUNITY
FARMERS
RESEARCH
DEPT. AG.
MARKETING
STUDENTS
STAFF
SERVICE INDS.
GOALS
COURSE OUTLINE
SUBJECT
SYLLABUS
TEACHING & LEARNING
EVALUATE & ASSESS
DIPLOMATE
INSTITUTION
ACADEMIC DEPT.
INDIVIDUAL TEACHER
STUDENT
COMMUNITY
INVOLVEMENT

The term "community" is used within the framework to refer to all parties with an interest in the course. Therefore the community for any one course includes employers of graduates, representatives of associated industries, past students, staff of the institution, current students and people concerned with allied courses. In the experiences discussed in this paper, the community involved with the Agriculture, Horticulture, Farming and Dairy Technology courses had substantial industry membership, whilst the Primary School exercise involved parents and local community representatives.

The designers of the framework made particular note of the distinctly vocational nature of the course for which the framework was initially developed. With the exception of the Primary School example, the subsequent exercises have also been clearly directed towards specific training for industry. Hence the discussion centres much around the interaction between industry and the institution. The Primary School example is an interesting contrast since it deals with a different sector of education and has a more diverse community.

Setting the goals of the course is the step in which there is most community involvement. To achieve maximum benefit from people outside the institution in this task, the techniques of running consultative workshops was employed. Later discussion will suggest that the success with which these workshops were run is a significant influence on the successful implementation of the framework.

The feedback loops within Figure 1 underscore the consultation necessary to ensure that the intention of the goals is maintained through the planning steps and is manifest in the classroom experience. Such consultation is not incestuous within the institution. Representatives from the community, recruited at the workshop concerned with setting goals, continue a liaison role to maintain direction and relevance whilst allowing teaching staff due professional freedom.

Therefore the framework

- orders the decision making process;
- defines a client community to whom the institution is accountable;
- includes that client community in a consultative approach;
- provides checks to ensure that implementation is consistent with intention.

3. THE CONSULTATIVE WORKSHOP TECHNIQUE

The strategy for determining course goals in consultation with the community was to run a "Curriculum Workshop" to which representatives of industry, students past and present, staff and other interested people were invited.

Participants were invited on the basis of previously expressed interest in the College and its courses, or on the suggestion of staff who perceived that individuals or organisations may have had an opinion or expertise of value to the exercise. The invitation was sent with information concerning the objective of the workshop, the nature of the course under consideration, the constraints imposed by finance, politics, or resources, and the implications of any outcomes of the workshop.

In the opening session of the workshop, the context of the course and its development were outlined briefly and with a minimum of value judgements so as to reduce the risk of bias in community responses. An equally important aspect of the opening session was to welcome participants recognising the interest they had shown through their attendance and undertaking to consider their contribution as a valuable component of course planning.

Small groups were then asked to react to an open-ended question in a brainstorm session. The question was phrased according to the course under consideration. For example, in the first workshop, the question was

> "A Diploma in Agriculture course should ......"

Staff acted in these groups as facilitators to elicit as much candid comment from participants as possible, and as recorders of reactions. In accordance with the rules of brainstorm any evaluative comment at this stage was barred.

When brainstorming was complete, each group ordered and gave priority to what they saw as the broad goals of the course. Ancillary comments on teaching method, assessment, facilities, selection of students and a number of other issues arising from the brainstorm were noted for future reference.

Each small group then joined with another to combine their lists of goals. At a subsequent plenary session all groups contributed to a set of goals accepted by all the workshop participants. Consensus was negotiated by open discussion.

After adoption of the goals as agreed to by the plenary session, small groups considered some of the practicalities of teaching, timetabling and testing.

Suggestions in these areas were recorded by staff as ideas for subsequent planning. These discussions gave useful opportunity for the institution to check the community's intention as expressed in the goals.

At the conclusion of the workshop, a working party of industry representatives was nominated to act in an ongoing liaison role for further course development.

During the workshop, time was devoted to tours of inspection and informal social gatherings for participants to increase their awareness of College activities and to establish links between staff and the outside community.

The framework does not prescribe the method of consultation. However, we have found that the workshop technique can be used most effectively as the method by which community involvement is initiated. Limitations to this effectiveness need to be recognised.

4. LIMITATIONS AND INFLUENCES

The successful use of the framework and the workshop can be assessed on three criteria:

1. A course acceptable to the institution and the appropriate community is developed and presented.
2. Liaison between the institution and the community is maintained to permit ongoing review and monitoring.
3. Positive feelings continue between the institution and its community.

In each of our experiences of course development and review using these methods, the extent to which these criteria were satisfied varied as a result of influences from within the institution, from the industry that was consulted, and from the nature of the interaction at the workshop. The examination of these influences is concerned firstly with the task of developing courses in consultation with industry for specific vocational ends.

5. INFLUENCES FROM INDUSTRY

For this approach to be successful, the industry concerned must:

1. value formal educational training both through expressed policy and practical recognition of those who complete training. Without these there is little interest or incentive for the industry to enter a consultative process;
2. perceive the institution involved as worthy and competent;
3. see the institution as appropriate for the particular type of training that the industry requires;
4. be able to express its needs in terms of the skills and attributes of the person who has completed training, the number of people required at various levels of training, and the foreseeable trends within the industry;

5. clearly describe the role of the graduate within the industry particularly outlining their interaction with people of other disciplines and different levels of responsibility;
6. contain key people who are available for continuing input and support in the curriculum development process, and who are able to maintain an ongoing liaison role to retain the intention and direction of the course goals as established by industry representatives at the workshop;
7. demonstrate positive support for the institution in its activities, and in its desire to innovate;
8. desirably contain people who have rapport with members of the institution thus facilitating informal interaction at the personal level.

6. INFLUENCES FROM THE INSTITUTION

The success of this approach is also affected by factors deriving from three aspects of the institution;

A. staff attitudes
B. staff skills
C. organisational influences

A. Productive change is more likely when

1. staff are committed to change and act cohesively towards achieving change. This does not pre-suppose that the direction of change is known nor agreed to. The group must collectively agree that change is desirable;
2. individual members of staff are enthusiastic and motivated to be involved in the process of change;
3. individuals are confident of their capacity to cope with change, despite its implications -
    (a) personally - changes can significantly alter the official identity of a member of staff; such changes may appear to elevate or reduce the status of that staff member;
    (b) academically - staff need to be confident in their discipline so that adaptation to new course structures and requirements are not seen to be hostile to the integrity of their subject;
    (c) behaviourally - new course structures, alternative approaches and different methods of presentation require a new behaviour pattern of academic staff;
4. staff have positive feelings towards a co-operative approach with industry, are willing to accept the validity of industry's point of view, and yet maintain their own professional position.

These attitudinal pre-requisites interact with the skills available from among the staff of the institution.

B. Important staff skills are those in the areas of

1. facilitating discussion in the initial stages when determining course goals, and later when matters of contention are being resolved;
2. resolving conflict between participants at the workshop stage and in subsequent planning discussions;
3. developing a consultative approach with colleagues so that the process involves as many staff as possible;
4. developing a supportive style of arrangements and interactions that will reinforce positive contributions to the process by individuals and groups. Such support engenders enthusiasm and motivation;
5. organising tasks to be completed and allocating such tasks so that all participants in the process appreciate the logic of actions, see that the process is under control, recognise the contributions of delegated individuals, and have real opportunity to contribute.

C. Certain other influences exist within the institution which may interact with staff attitudes and staff skills.

1. The stability of the staff. A teaching staff largely consisting of people on limited tenure, or of people who for various reasons see no long term future in the institution, are unlikely to develop any commitment to or enthusiasm for change.
2. The enthusiasm, activity and competence of senior staff, particularly the person responsible for the institution.
3. The credibility of staff delegated to lead the process in the eyes of the staff and the industry.
4. The political climate within the institution. It will be counter-productive if the need for curriculum change is exploited by individuals or groups to control others or achieve power to some other end. Such a climate is contrary to a cohesive staff effort.
5. The political climate outside the institution. The need for change should be perceived from within. If it is prescribed from outside for political or economic ends by someone not seen to be empathetic with the institution, change will be resisted.

7. INFLUENCES IN THE INTERACTION

Because this approach relies on an interactive and consultative liaison between the institution and industry, much of its success will depend on the nature of the interaction at the workshop level and in subsequent discussions to develop course structure, subject syllabi, and teaching strategies. In the previous two sections reference has been made to attitudes and perceptions of each partner in the process for the other. The factors listed here pervade the whole process but are most significant to the formal interaction at the workshop level.

Preparations for the workshop should be directed towards -

1. achieving adequate representation from industry, with participants alerted to the nature of the exercise, their role in the process, and the constraints on the task. It is important that representatives bring enthusiasm and competence to the task, and feel committed to making adequate preparation for their role at the workshop;
2. briefing group leaders on their role at the workshop, so that they adopt a non-directive and yet facilitating role in discussion groups, a conciliatory role when consensus is desired, and an empathy with industry for subsequent consultation. This briefing is beneficial for all staff involved as it assists the general atmosphere of the workshop and encourages a broader liaison with industry afterwards. Group leaders should be selected for their skills in group work, and for a commitment to the task in hand.

During the workshop program it is important that -

1. the opening session be welcoming and project an atmosphere of consultation. The surroundings should be convivial and no more formal than is necessary. Introductory remarks should be minimal, open-ness of comment encouraged, and participants set at ease;
2. the general strategy of the workshop be explained, highlighting the facilitator role of staff, the methods of developing ideas by brainstorming, followed by discussion and consensus, the rights of participants to be heard, the sequels to the workshop, the subsequent procedures and deadlines for the course development process;
3. brainstorming sessions and consensus discussions are administered competently and sensitively by staff and adequate records of group activities are kept. These records constitute valuable raw material for the development of subject syllabi and teaching strategies. In these groups the real test of open-ness in discussion is in operation. Our experience is that such groups are best when small, but structured to give broad representation;
4. time is taken to achieve consensus, so that all participants have ample opportunity to contribute and influence that consensus, and that the processes employed are open to all, and thereby the final consensus is credible, not engineered;
5. the working group exercises its right to ongoing representation in course development by selecting representatives to liaise with staff in the production of course structures, subject syllabi and teaching strategies, thereby ensuring that the workshop's intention is sustained in the institution's implementation;
6. sufficient informality is included in the workshop program to permit the development of individual rapport between members of staff and members of industry;
7. the workshop should conclude with positive feelings of achievement, a summary of what has been decided, a re-iteration of the subsequent steps and the industry's involvement, and a commitment by the institution to provide feedback on subsequent decisions and developments.

8. OUTCOMES

The use of the decision framework and the consultative workshop for the development of the two UG-2 Diploma courses at Dookie, in Agriculture and in Horticulture, has had significant benefits.

As a result of the contact with industry, a better balance of theoretical and practical content within the course was achieved. The integration of these two areas and their importance within a student's studies were emphasized.

A more flexible course structure was made possible by virtue of industry's request for breadth and specialisation. Whereas previously these two aspects of the course appeared contradictory, when employers of potential graduates specified the nature of specialist skills desired, a balance was achieved by the introduction of a unitized course with a core and electives.

Consultation with people outside the institution added markedly to the credibility of the new course design and approach. Staff therefore had confidence to plan and to teach a course knowing it reflected current industry needs.

The development of the Certificate in Applied Science in Dairy Technology was undertaken for another institution. When questioned on the significance of the workshop and subsequent discussions, staff confirmed the improved credibility of courses developed by this consultative process. In addition they commented that the identification of key people in industry for future liaison was a valuable benefit.

For both Certificate courses, in Farming and in Dairy Technology, the improved credibility of the courses in the eyes of industry has been important,because in both cases full time students spend time on block release working in industry. Relationships between the institutions and related industry are vital to this scheme and have been enhanced through the consultative process.

In the case of the rural Primary School, there was significant hesitancy on the part of parents who felt ill-equipped to comment on what the curriculum should be. Equally, some staff felt threatened by the requirement to consult parents. Hence the degree of participation by parents and by teachers was less than optimum. However, through a limited consultation an increase in parent involvement in school policy and curriculum was achieved.

9. SUMMARY

Our experiences with this approach encourage us to believe in its worth,although some experiences have been less than productive because of problems associated with the community being consulted, the institution concerned, or the relationship between the institution and its community, or because there was inadequate adherence to the process of consultation as outlined in the model.

The positive attributes of this approach are -

1. the development of positive attitudes towards the institution on the part of industry;
2. a greater confidence by staff to work with industry in other co-operative ventures;

3. a greater relevance and credibility in courses developed by this method, which are satisfying to staff and students alike;
4. that industry has a responsive agency for future needs in the area;
5. people and institutions are helped to healthier attitudes to change.

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MIDDLE LEVEL TECHNICAL TRAINING BY EXTERNAL STUDY - A CASE STUDY

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Capricornia Institute of Advanced Education is a regional multidisciplinary college in Central Queensland and is the only Queensland institution allowed to offer degree and associate diploma courses in Applied Science by external study. External science degree courses in the major disciplines were first offered by C.I.A.E. ten years ago and are now a major activity for the college.

The Associate Diploma in Applied Physics was established seven years ago. It was designed as a two year, full-time course to produce laboratory technicians who could use and maintain a range of equipment for making physical measurements. The course was available by both internal and external study, with external students attending residential schools at Rockhampton to complete the compulsory laboratory work. In the first three years of operation the external enrolment grew steadily but the internal numbers never became viable. Discussions with industry representatives in Queensland showed that there was little demand for internal graduates from the course because in general they lacked any trade qualification and so were restricted in the work they could do. There was, however, strong support for the external offering of the course, and several suggestions were made by the industry consultants about the way the content could be made more relevant to the industrial process.

Accordingly, four years ago a number of evolutionary changes was made to the course. It was no longer offered in the internal mode. The course, which had previously comprised several very large subjects, was restructured into about thirty separate, semester-length subjects to suit external students. The subjects were organised, and new subjects introduced, to identify more clearly the electronics/instrumentation strand which employers had seen as a major innovative strength of the course. This restructuring had also to be achieved under constraints imposed by the Institute, which required that associate diploma subjects in science and engineering be rationalised wherever possible. The Department of Applied Physics, recognising that it now had a major involvement with the external associate diploma, started development of a series of 'home experiment kits'.

External enrolments rose substantially. Major employers, such as Mt. Isa Mines Ltd. and Queensland Nickel Pty. Ltd. encouraged some of their instrument tradesmen to embark on the course and provided financial incentives for them to progress. Consultative contact between the teaching staff and the employers of the external students was strengthened with staff regularly visiting industrial plants. The course became due for its five-year reaccreditation in 1983 and this exercise provided the opportunity to make further evolutionary changes. The most visible change involved the title of the course; to emphasise its major theme of instrumentation and its direct relevance to industry, the title became 'Associate Diploma in Industrial Instrumentation'. Further changes in subject content were made, with those subjects involving computer applications and process measurement being considerably expanded. Subjects which appeared to duplicate or parallel material usually covered in a trade course were dropped, and successful completion of a certificate in a relevant trade was introduced as a criterion for normal entry into the course. A five year study schedule for the course was defined which minimised the number of times a student had to attend residential schools at Rockhampton.

Demand for enrolment in the re-named course in 1984 became sufficiently high that a real quota had to be applied, restricting entry to people who already held a trade qualification. Thus, 73 students commenced the course this year, joining about 70 students who are further through the programme. When they complete the course, these students will be eligible to apply for membership of two professional bodies, the Institute of Instrumentation and Control Australia and the Australian Institute of Engineering Associates.

FEATURES OF THE COURSE TODAY

Instructional Methods

Most of the subjects in the course have both a theory and a practical component. Ideally these would be taught together, but so far it has only been possible to achieve this in the few subjects for which a home experiment kit has been developed. In other subjects the practical work is dealt with in blocks, during residential schools.

The theory material is developed in comprehensive study notes especially prepared by C.I.A.E. staff. In many cases these notes are fully self-contained and include worked examples and problem sets. Whilst the preparation and production of such notes is a demanding and time-consuming exercise, it does ensure the continued supply of coherent teaching material. It has been our experience that the alternative of providing a short study guide to a commercial textbook is too unreliable; changing editions, books out of print or unavailable to students in remote areas all occur to thwart the learning process.

Students are paced through the material by a series of regular assignments. These are marked and annotated by the staff member teaching the course and returned as quickly as possible. Tutorial support for these external students is provided in three ways. At the beginning of the year, and at intervals in each semester, academic staff travel to study centres throughout Queensland, meeting and discussing problems with groups of students. Telephone contact is encouraged; students can call staff members during the day for individual help, or leave a message on the answering service at night. And finally, tutorials are also held at the residential school.

The practical component of the course is regarded as particularly important for students at the associate diploma level. Formally, it accounts for about one-third of the course hours and its demand on resources is considerable. In many subjects the practical work takes place in the residential schools held at the Rockhampton campus during the secondary school holidays. Students generally stay at the C.I.A.E. residential college, and follow a programme of tutorials and laboratory work which often lasts from 9 a.m. to 9 p.m. each day. It has been possible to schedule subjects in the first three years of the course so that students need only attend one residential school per year to complete all the requirements for that year. However, to accommodate the student numbers with existing resources it has been necessary to hold the first year practical work twice per year and offer students a choice of attendance dates. This has been appreciated by students in seasonal industries, such as the sugar industry, who have difficulty getting time off work at particular periods of the year. For the final two years of the course attendance at two residential schools per year is required, because of the longer duration and more complex equipment used for each subject.

A significant feature of the course is the 'home experiment kits' which have been developed to enable students to complete the practical work in sequence with the theory in their own home. The kits are fully self-contained and are sent out on loan to each student who has returned a signed request form. No deposit is charged, and students are asked to return the kit with their final assignment in the subject; a final examination result is issued in a subject only after the kit has been returned, and to date a return rate in excess of 99% has been achieved. Home experiment kits have been developed in the subject areas of optics, digital electronics, microprocessors and microcomputer systems, and full specimen sets of rocks, ores and minerals have been put together for an introductory geology subject. These kits have been designed, manufactured and packaged within the Department.

The advantages to the student of this 'home experiment kit' approach are clear. He is able to develop his theoretical understanding and his practical skills at the same time, a time of his own choosing. He is relieved of the cost, in time and money, of attending a residential school in the subject. The advantages to the college lie in the reduction in demand for laboratory space, the removal of the need for academic staff to organise and oversee several days of intensive residential school, and the fact that the material is often better learned. The costs, however, are substantial. Significant staff and technician time is required during the development and construction stages and for the subsequent maintainence of the kits. The financial investment can be very high; the full microprocessor kit costs about $200, and in the last three years over $40,000 has been spent on kits for use in this and related courses.

Parts of the material in the course are quite suitable for inclusion in a computer managed learning system. It is intended in second semester 1984 to despatch a floppy disc to each student studying the subject Electrical Instrumentation. The disc, for use on Apple-compatible systems, will contain tutorial material and test questions. Students will be asked to complete a minimum number of questions and return the disc, which will have recorded on it the student's score, as an assignment in the subject. Apple computers are available at the study centres, but a number of students find access to these difficult - it will be interesting to see just how wide is the availability of Apple-compatible microcomputers amongst students on the course.

Students

It is a usual feature of external studies courses for students to enter with a wide diversity of backgrounds and abilities. This feature seems less pronounced in science and technology courses, and less still in the Associate Diploma in Industrial Instrumentation. The student profile is remarkably coherent in both entry standard and course expectation.

Most students now enter after completing a basic trade certificate course, usually in the electrical or instrument fitting areas. A few will have completed advanced trade courses in electronics and for these students exemptions in the corresponding associate diploma subjects are given, though it can be a major exercise assessing the level and content of some courses. The typical student age range is from about 20 to about 40 years old. Many students are already employed in the instrumentation field in industry and give as their major reason for taking the course a desire to improve their understanding of the equipment they work on. Related to this of course is the desire to enhance their career prospects by upgrading their qualifications; some industries now specify that an associate diploma is required for entry to the technician grades of employment. Other students are in instrumentation-related fields, such as technical sales and communications, or are intending to enter that field. There are very few students studying the course for non-vocational reasons, though one or two of the older students may never make use of the material they learn.

Although some students have studied short courses at home, extensive external study is new to most of them. They therefore encounter many of the adjustment problems common to all external students. Experience has shown that for students who are employed full time in an industrial environment, an initial study load of typically 9 or 10 equivalent contact hours per week, about three subjects, is the most appropriate. This compares to the 22 hours per week that a full-time student would do, and accounts for the five year time scale for the course. Residential schools in the course are usually of six days' duration, and a student will attend about seven such schools before he graduates.

Student attrition rates in external courses are regularly higher than in internal courses. Students are known to defer or drop out from their courses for a variety of reasons, such as change in personal circumstances or work function, inability to implement an effective study schedule, loss of interest in the course or frustration at faults in its content or delivery or simply because they have gained all they wished to from studying only parts of the course. No survey has yet been made of the reasons why students drop out from the present course, and indeed such surveys are notoriously difficult to conduct, but some general remarks can be made. The highest attrition rate, about 40%, occurs in the first year of the course. Since one of the first things a student must do in the course is return a request form for his digital home experiment kit, and about 10 to 15% of students do not even do this we know that some students leave the course essentially before they start it. A further 20% or so drop out in April, either by failing to register for assessment or by asking to defer or withdraw. Generally, students who withdraw or defer and return their digital kits send an accompanying letter of explanation; increased responsibility or workload allocated by the employer is commonly cited as a reason for deferment.

Female students are seriously under-represented in the course, although this is probably a reflection of the situation in the industrial workplace. However, this year the first female student was enrolled.

Spin-offs

One consequence of the sophisticated technology currently being introduced in industry is the need for training and updating programmes for the personnel associated with that technology. However, industry is very reluctant to allow its key staff long periods of time off to study full time or part time at a tertiary campus. Instead, it looks for short courses held on-site or some form of self-contained learning package. An institution which operates an external study programme is well geared to meet such training demands from industry because it already has available a whole series of tried and tested learning packages. Individual subjects or combinations of subjects may quite readily be modified to suit a particular need. In addition there is a less well-defined but nevertheless substantial demand for continuing education courses in many areas, including technology, from the general public. An existing subject from an external course could well form the basis for a commercially viable product to meet that demand.

Such considerations have led to several instances where the material from the Associate Diploma in Industrial Instrumentation has been made more generally available. A two-day short course on Industrial Radiation Safety was requested by an employer and developed from existing external studies material. The course has run twice in the last year, and other employers have requested that it be offered again later this year.

A complete course in Microprocessors and Microcomputer Systems, based on the home experiment kit and external notes used in associate diploma subjects, has been developed as a continuing education course for home study. The course was first marketed a year ago and about 100 units at $320 each have been sold so far. Each unit contains the microprocessor home kit, a set of study notes, a book of practical exercises, a cassette of demonstration programs and a series of assignments which may be sent in for marking. Some employers have requested multiple units for groups of their staff and additional sets of notes at reduced cost have been supplied. A similar course in Digital Electronics, again based on a home experiment kit, has just been completed and will be advertised shortly.

Although there is additional staff effort involved in preparing an external subject for general consumption the advantages can be significant. A good course can enhance the institution's reputation in the field and open up a number of worthwhile contacts. The accredited tertiary course can also benefit from these contacts and from the broadening of staff member's experience. A profitable course can add to the budget of the teaching department, and there is the general satisfaction of having met a real community need.

LESSONS FOR THE FUTURE

In the seven years of operation and development of what is now the Associate Diploma in Industrial Instrumentation a number of lessons have been learned. Perhaps the most important is that it is possible to offer successfully a practical course at this level by external study. The second lesson is that there may be a demand for such a course only in the external mode, and if so it is not necessary to maintain a non-viable offering in the internal mode.

A further lesson concerns the adaptation of a course to find its appropriate market. Employers of typical students can provide useful input in the design and structure of the course; this in turn can attract additional students from other sources with further ideas which could be incorporated. To make this process efficient it is necessary that the course and its content be obviously relevant, by overt design, to its intended audience. Also, the entry qualification for the course should be appropriate; at the associate diploma level in the external mode an entry criterion using a school-based tertiary entrance score may be entirely inappropriate, whereas something like a trade certificate can indicate to all concerned the type of student for whom the course is intended. Likewise, recognition of the course by professional societies can attest to its practical relevance.

What developments remain for the course? Apart from content update there are several possibilities at this stage, all relating to the external-only status of the course. For instance, it should not be necessary to adhere to an academic timetable designed for full-time, internal students; several entries at different times of the year could be in order; residential schools at times other than school holidays could suit some students and make more efficient use of equipment and laboratory resources. Or perhaps residential schools could be held in a number of locations -

certainly it is only the residential school requirement which makes difficult the offering of the course throughout Australia. There is also a need for home experiment kits in further subjects, such as analogue electronics, where the theory and practical material are best studied together.

There are several drawbacks with the use of voice-only telephones to provide tutorial support in technical subjects in which graphic material is the usual means of communication. Developments are just starting on the use of the 'AREGON' system to provide a two-way graphics capability on a second telephone line. Parallel developments using satellite technology could also be expected. In each case the facility would in the first instance provide a link between the Rockhampton campus and the external study centres.

It is hoped that this case study has demonstrated that continuous development in an external-only technological course at the associate diploma level is both possible and of benefit to all concerned. However, as in any course, all of these developments depend on the competence and enthusiasm of the academic staff responsible for the course.

UG3'S IN TAFE - A CANBERRA EXPERIENCE

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INTRODUCTION

Technical Education in Australia has a history dating back over 100 years. In 1974 the Commonwealth Government released the so-called Kangan Report into Technical and Further Education (TAFE) in Australia, which initiated fundamental changes in Australia's third and largest tertiary education sector. These changes have presented, and continue to present, a major challenge to educators and educational administrators in TAFE.

This conference deals with what are perhaps the most significant challenges being faced by tertiary education. Some of these issues which I will cover in this paper are:

1. A changing student population
2. Development and accreditation of courses
3. National registration of awards.

These issues currently affect to some extent most TAFE teachers in the A.C.T. In order to deal with these issues in a concrete way I will outline my experience in the revision of one course conducted at Canberra TAFE College. This course, now known as the Associate Diploma in Geoscience, was introduced by Canberra TAFE College in 1975 under the auspices of the N.S.W. Technical Education Department.

HISTORY OF THE GEOSCIENCE COURSE

In the early 70's the College was approached by the Bureau of Mineral Resources to develop an appropriate course for trainee technical officers. Two important constraints on such a course were:

1. The students would be required to attend full-time (30 hpw + field work).
2. The course had to be acceptable to the Commonwealth Public Service Board concerning entry to Technical Officer status.

The result was a certificate level course of 2400 hours duration. At the end of 1976 the trainee technical officer scheme ceased and Canberra TAFE College was left with a course, teachers, equipment and some later stage students.

Before proceeding further it is worth considering the type of students enrolled in the course. With few exceptions they had been selected, at interview, from a large group of applicants for the prized trainee positions. Consequently they were a particularly able group. Staff who had been involved with the course expected high standards.

After the cessation of the trainee scheme the course was advertised to the general public, but in 1977 insufficient students enrolled so the course did not run. Following intensive publicity a viable group was obtained in 1978.

Most entrants were well qualified and had at least some Year 12 education, and this set the pattern for the next three years. Eventually a Year 12 qualification became a de-facto entry requirement, as only exceptional persons entering at Year 10 level had any chance of success. This was not really a problem as the A.C.T. has an extremely well educated population. There is a strong expectation by parents that their children will attend school until Year 12 and then continue their education in a tertiary institution. Thus the retention rate to Year 12 in the A.C.T. is nearly 70%. In this respect trends appearing in the A.C.T. may well be an indication for the other major cities of Australia. Certainly general retention rates in Australia [see Jones (1982)] are low compared with other developed countries, and can be expected to rise significantly in the next ten years.

In 1980 the Geoscience course was due for revision. Although curriculum revision was completed in 1982, final administration arrangements are not yet completed in 1984. I will attempt to explain what happened and why it happened.

DEVELOPMENT AND REVISION OF A.C.T. TAFE COURSES

The A.C.T. TAFE system consists of three Colleges (Canberra, Bruce and Woden) operating at three main campuses and several annexes. Each College is largely independent but some co-ordination is provided by the Office of A.C.T. Further Education (a cell within the Commonwealth Department of Education and Youth Affairs).

Furthermore, the A.C.T. TAFE system is decentralised with little educational expertise located in the Office of A.C.T. Further Education. Many courses are conducted only at one College and so course development is the responsibility of individual Colleges.

In order to maintain standards for courses an external accrediting agency (the Further Education Accrediting Committee or FEAC) was established. This Committee establishes guidelines for course development and, through a system of expert sub-committees, accredits courses at appropriate levels. Until recently three levels were possible - Certificate, Trade and Course Award. Non-award courses are also offered.

TAFE colleges develop courses in consultation with the local community. At Canberra TAFE College a consultative Committee (consisting of representatives of employers and other interested groups or individuals) has been established for each major course. Initial planning and curriculum development is conducted by teachers (usually with some release from teaching) assisted by specialist staff from a small curriculum group located at the College. The results of this work are considered by the Consultative Committee and, if necessary, revised. The curriculum is then considered by four other committees within the College (New and Revised Courses sub-committee, Board of Studies, Education Committee of Council and finally the College Council). The document which emerges from this process is forwarded to the Department of Education and Youth Affairs and, if funds are available, may be approved to run. Only courses which are actually running are considered by FEAC for accreditation. Obviously, this is a lengthy process. Revision of an existing major course can take two years, while development of a new course can easily take three or four years.

As may be expected there is significant dissatisfaction with the ability of TAFE to respond to community needs. However, the process described above has evolved as a result of the need to maintain standards and clearly define the aims and objectives of TAFE courses. Hopefully someone may, someday, resolve these two apparently conflicting factors.

THE GEOSCIENCE REVISION - INITIAL CONDITIONS

By 1980-81 the Geoscience Certificate at Canberra TAFE College had become a national standard for technician training in Geoscience. The course was highly acceptable to employers across the country - during the mini-boom of 1981 graduates of the course could usually choose from three or four jobs. This acceptance led to the first problem - the course could not be reduced in content.

As I have previously stated, some 70% of A.C.T. students stay at school till Year 12. About 85% of students entering the Geoscience course had studied to Year 12 level with the majority of the remainder being mature age entrants. It was decided that the revised course would formally require Year 12 qualifications for entry. The basic plan was to revise the course without changing the general thrust but to require Year 12 Mathematics and English as an entry level. In summary the course would require:

Two years full time
30 hours per week + field work
Year 12 entry

Since 1977 Canberra TAFE College had been offering an Associate Diploma (UG3) in Valuation (Real Estate). It was decided that such a qualification would be appropriate for the new Geoscience course. The Consultative Committee and the College Executive agreed and the revision commenced.

In order to cater for the few Year 10 entrants a part-time certificate course (Earth Science Certificate) was designed. Few problems have arisen from this and I will not refer to it again.

Problems

By the end of 1982, after a year of intensive work by staff and the Consultative Committee, a completed curriculum document was available. For a Certificate course the work would have been essentially completed, but in this case it was just the beginning.

All Associate Diploma proposals are referred to the Advanced Education Council of the Commonwealth Tertiary Education Commission for funding and accreditation. Unknown to staff involved with the Geoscience revision, the UG3/Certificate/Middle Level course issue was a "hot potato" in 1982/83. The basic problem appears, now, to have been one of funding.

In March 1983 the Commonwealth Tertiary Education Commission released a paper entitled "Review of Middle Level Course" which made clear the Commission's concern over the funding issue. The problem was that TAFE courses are funded by the States whilst Advanced Education courses, even those conducted by TAFE, are funded by the Commonwealth. Of course, in the A.C.T. TAFE is also a Commonwealth responsibility, but a principle was at stake.

It seems that the Advanced Education Council of the CTEC did not want to directly refuse our proposal. Instead it suggested that the proposed course would compete with an existing Associate Diploma in Geology at the Canberra College of Advanced Education and asked for additional information (twice). After the CCAE denied that there would be any conflict, silence reigned. By this time it was too late for the course to run in 1983 and so implementation of the new course was delayed for a year.

By 1983 the Consultative Committee were becoming very concerned at the delay and decided to take action. Simultaneously, students of the course took the problem to their Members of Parliament. After a number of meetings between Consultative Committee members and the Director of the Office of A.C.T. Further Education, a letter was written by the (then) Secretary of the Department of Education and Youth Affairs (Dr. Wilenski) to the Chairman of the Tertiary Education Commission (Mr. Coughlan). In essence the letter requested that the Geoscience and Accounting/Banking UG3 courses be approved. In particular, Dr. Wilenski wrote:

> I wish to confirm that, for the following reasons, I see these courses as being appropriately offered by Canberra TAFE College:
>
> 1. Canberra TAFE College has the human and material resources required for the adequate provision of the courses. This applies particularly to the Geoscience course, which as you know, has developed from the Geoscience Certificate course which has been taught for a number of years at the College. Canberra TAFE College is also well qualified to teach in the Business Studies area and is well able to offer a UG3 course at an appropriate level.
>
> 2. There is a demonstrated industrial demand. The College has been contacted by industry representatives seeking the offering of the Geoscience course. Similarly Mr. Allen has been approached by representatives of CRA Exploration Pty. Ltd., Woodlawn Mines, Samedan of Australia and the Australian Mining Industry Council as recently as last week seeking a similar outcome. The business community has given its support through the College Course Consultative Committee and in College surveys for the offering of the Accounting/Banking Course. Support has also been given by the relevant professional body, The Institute of Affiliated Accounts (A.C.T. Division).
>
> 3. There is sufficient student demand, as demonstrated by enquiries received by the College, concerning both courses to justify these being offered. Should numbers fall below the required level at some future date, the course will cease to be offered.
>
> 4. The Canberra College of Advanced Education does not intend to offer similar courses. The CCAE has advised that the Geoscience course in no way duplicates any course offered at the CCAE. The Accounting/Banking course has similar content in some areas to that covered in the UG1 course offered at the CCAE but not to the extent that the CCAE has any concern about the TAFE course duplicating the UG1 or attracting its students. While recognising that the CCAE could offer such a course I consider it appropriate for the Canberra TAFE College to do so, in view of its expertise and experience, and given that the CCAE does not intend to do so.

> While I consider the UG3 courses should not be offered in TAFE Colleges in a wholesale manner, it is my view that these proposals meet the basic criteria necessary for acceptance. The TAFE College is well equipped to offer the courses, and the CCAE has no intention of competing at the same level. Any decision taken by the Commission in this case will not be seen as a precedent for future proposals, which will have to stand on their own merits.

He then added:

> I understand that the Commission is conducting a review of middle level courses and that this is some way from completion. In my view the proposals mentioned above should not be delayed because of this. (Wilenski 1983).

With such support, we thought we had won! Mr. Coughlan, however was not persuaded. The funding issue, and the possible precedent, were obviously too important.

In his reply to the Secretary, Mr. Coughlan wrote:

> In relation to advanced education courses, the position that the Commission has under consideration is that new advanced courses would not be funded by the Commonwealth outside Colleges of Advanced Education except under contractual arrangements of very special circumstances; middle level TAFE courses would lead to an identifiable TAFE award and would be funded by the States under normal arrangements.
>
> The two Canberra TAFE College proposals have been considered against this background and in view of the fact that decisions on them could have important financial implications for the Commonwealth in its relations with the States, the Commission's view is that if there is a clear need for these two courses, they should be offered by the Canberra College of Advanced Education, either on its own campus or under contractual arrangements with the Canberra College of TAFE with the award being that of the Canberra College of Advanced Education. Alternatively, if it is considered that these courses would more appropriately be offered by the Canberra College of TAFE, presumably to retain an essential TAFE orientation, they should lead to an identifiable TAFE award and be funded from the College's normal budget. In this context, it is noted that the Canberra TAFE institutions, unlike TAFE institutions in the States, do not offer a higher certificate award. However there appears to be no reason why a higher level nomenclature should not be developed by the TAFE institutions in the ACT (Coughlan 1983).

Present Situation

The Geoscience course was left stranded. It was designed as an Associate Diploma but could not be funded through the Advanced Education Council of the CTEC. Eventually, only one decision could be made - a new level of course was introduced into the A.C.T. TAFE for accreditation through FEAC.

The Acting Director of the Office of A.C.T. Further Education put forward the following recommendations:

1. That Canberra TAFE College offer in 1984 courses in Accounting (Banking) and Geoscience.
2. That these be advertised as being TAFE courses at Associate Diploma

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2. (UG3) standard, the actual TAFE award nomenclature to be advised when TAFE Directors have reached agreement on TAFE course nomenclature.

3. That the courses be accredited by the A.C.T. Further Education Accreditation Committee.

4. That future TAFE courses at this level be approved by the Director of A.C.T. Further Education and the relevant TAFE College Council in consultation with the Territorial Policy and Co-ordination Branch of the Department. (Rolfe 1983)

These were approved by the Minister for Education and Youth Affairs, Senator Ryan, in December 1983. Amid considerable confusion the new course was advertised at Associated Diploma level (subject to approval and accreditation) and the first students were enrolled in February 1984. In the short time since then the name Associate Diploma in Geoscience has become firmly established in the minds of staff and students. It seems likely that the name will "stick".

CONCLUSIONS

1. Throughout the whole of this protracted exercise the educational standard of the proposed course was never, to my knowledge, considered by any person outside the college. The CTEC rejected our proposal for non-educational reasons. The course is now running but its educational level has not been assessed. Currently it is not known what standards will be established for Associate Diploma level courses in A.C.T. TAFE.

   Funding was not really an issue either, since the Associate Diploma in Geoscience replaces an existing course of the same duration. The real issue seems to be the possibility that State authorities might use this precedent to transfer the cost of some middle-level TAFE courses to the Commonwealth by upgrading Certificate type courses to Associate Diplomas.

   It should be a simple matter to divorce financial and educational considerations. This proposition is supported in the Kangan Report (para 1.15). Such an approach would allow TAFE institutions access to the nationally recognised UG3 (and possibly UG2) classifications without adding to the Commonwealth education bill. As the situation now stands it will be necessary for each TAFE system to develop its own solution to the problem of a changing student population. Each system will have to decide on nomenclature, definitions and accreditation. This will be duplication of work already done by the Advanced Education sector.

   In the A.C.T. it is likely the FEAC will eventually consider the Geoscience course for accreditation (after it establishes standards for Associate Diploma level courses). Because of present usage the title of the new award will probably be Associate Diploma. A new award will then add to the confusion of TAFE awards. As the name gains acceptance in the local community, any moves to replace it by some uniform national name will be resisted. An attempt at simplification will have ended in added confusion. Certainly in the short term people will wonder how this new (TAFE) Associate Diploma compares with a (real) Associate Diploma.

2. TAFE has changed significantly in the last 20 years. In the 1960's Technical Education was largely concerned with the training of employed part-time students. Many students were enrolled in trade-type courses. In the 1980's there is more emphasis on education as opposed to training. There are increasing numbers of full time students with no or

little experience of work.

Middle level (certificate and diploma) courses are becoming a very significant part of TAFE. As retention rates in secondary education increase (and it is likely that the Government will encourage this if its Draft National Technology Strategy is any guide) participation in TAFE middle level courses will increase.

In the A.C.T. 70% of students continue their education to Year 12. As a consequence Year 10 entry level courses (such as TAFE certificates and diplomas) are becoming less relevant to the needs of the A.C.T. population. It is likely that this trend will occur throughout Australia. If this is the case TAFE must actively enter the Year 12 entry level course arena. The alternative is that TAFE concentrate on trade training, retraining, hobby courses and "band-aid education" (such as the Employment Program for Unemployed Youth, EPUY).

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Both TAFE and the Advanced Education sector provide middle level training. It is widely accepted that, although entry requirements differ, in many cases the end product is fairly similar. Certainly the job market for graduates of middle level courses from the two sectors is similar.

One outstanding difference between awards in the two sectors is nomenclature. The Advanced Education sector has a nationally accepted system of nomenclature and national standards for courses registered at the Associate Diploma (UG3) level. TAFE has nothing like this. Instead, it has a bewildering array of Certificates, Diplomas, Advanced Certificates, Associate Certificates and Post Certificates. The simplicity and national acceptance of nomenclature was one of the main factors which led us to seek a UG3 award for the Geoscience course.

CHAPTER 4

TEACHERS AND TEACHING

The bedrock underlying any wider discussion of the effects of tertiary education on the workplace or indeed on society must always be found in the actual processes of the classroom. The quality of teaching, its effect on learning, the learning processes of students, the perceptions of academic staff of their teaching role, and the facilities provided by institutions to develop this role are all aspects of this.

Papers in this chapter address some of these issues. de Rome and Boud examine the reasons for new staff's negative attitudes to spending time on teaching development activities, and they suggest strategies for changing this situation. Andresen et al. give an interesting description of the problems associated with a qualitative methodology in the process of finding out how teachers reflect on the progress of a course for which they have teaching responsibility.

The other papers in this chapter also work from a basis in theory to discuss teaching in various disciplines - Genn's paper studies the extent to which predictions made about the humanistic orientation of teaching in certain departments were verified empirically, while Oettli discusses the usefulness of foreign language teaching both as discipline and as vocational preparation, and describes a New Zealand university's response to the challenge of providing foreign languages in a business studies course. Newell's paper addresses the reasons for changing teaching from traditional to resource-based methods in a Department of Chemical Engineering, and Sutanto gives a rationale for and a description of the introduction of a computer-based teaching system in an engineering faculty. Within the TAFE sector Mitchell's paper addresses the perennial problem of assessment in experiential subjects (known here as Life Skills subjects).

STAFF DEVELOPMENT AND THE SOCIALIZATION OF INCOMING ACADEMIC STAFF

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ABSTRACT

Over at least the past twenty five years there have been sporadic attempts, mainly in the form of reports recommending either incentives or training, to enhance the quality of teaching in Australian universities. A number of institutions have responded by establishing programmes to assist new appointees. More recently economic circumstances have lent additional urgency to the need to improve the quality and efficiency of universities' operations. Although student numbers have largely remained stable the numbers of new staff being appointed have declined. Consequently competition for the few new positions available is intense and the calibre of new entrants to the academic profession may be assumed to be correspondingly high. In fact, however, very little is known about the characteristics of this group, their background or their experience in teaching. This paper presents information drawn from a survey of staff newly appointed to a major metropolitan university. The pressures at work on new staff are discussed and the implications for organisational responsibility for the support and development of new staff are explored.

INTRODUCTION

A history of staff development in Australian universities would have little credibility or interest were one to omit all references to programmes established for new appointees. More provision has probably been made for this group of staff than any other. It is accordingly curious to consider how much is in fact known about new appointees as a group - in terms of their previous experience and their needs and expectations. To what extent is their assimilation into the institution eased by the efforts of their colleagues, and by others with more formal responsibilities for that process (i.e. heads of departments, staff development units, etc.)?

A general survey of the professional development activities of staff at a major metropolitan university provided the opportunity to obtain information which distinguished those who were recently appointed. The aim of the survey was to identify the extent to which staff had been engaged in activities which might be regarded as professional development and to seek their views and suggestions on issues relating to this topic.

METHOD

Two groups of staff were identified as possibly having differing experiences and needs with regard to staff development issues. Accordingly two somewhat different questionnaires were developed and administered during Session 1, 1982. To distinguish between the findings of these surveys the groups will be described as New staff, and One Year staff.

The first group comprised those newly appointed lecturing and tutoring staff who were eligible to attend the conference for new staff in February 1982. In effect this means that New staff refers to staff who had been appointed no longer than six months before the survey took place. (41 respondents, response rate 71%)

The second group were those lecturers and tutors who had been eligible to attend one of the preceding two conferences for new staff, either in August or February 1981. In effect One Year staff refers to those who had been at the University for between six and eighteen months. (57 respondents, response rate 58%)

The questionnaires sent to New and One Year staff were similar in many respects, as were some of their responses. For convenience of expression, where it is appropriate, the responses of these two groups will be combined and the groups referred to collectively as 'recently appointed' staff or staff 'appointed within the past eighteen months'.

RESULTS

The respondents included staff at all levels of the academic scale with the exception of Associate Professor which is normally a promotional position.

Table 1. Respondents

	Lecturing staff				Tutorial staff			
	Prof.	Assoc Prof.	Senior Lect.	Lecturer	Senior Tutor	Tutor	Others	Total
New staff	5	-	5	16	2	10	3	41
One Year staff	1	-	-	26	4	21	4	57

Few if any of the staff appointed within the past 18 months had much teaching experience prior to their present appointment. Almost half of those appointed to the lecturing staff had no previous lecturing experience, although a third had been employed as tutors. Almost 40% of the tutoring staff had no previous experience of teaching tertiary students and a further third had only experience of being a part time tutor. (See Table 2)

Table 2. Recent Staff Combined: Highest level of teaching responsibility held prior to this appointment.

	Tutorial staff n=46	Lecturing staff n=53
Experience	%	%
Full time lecturing	4	35
Part time lecturing	7	17
Full time tutoring	17	15
Part time tutoring	33	21
No tertiary teaching	39	13

When compared to the teaching activities such staff had engaged in since their appointment, their lack of previous experience might suggest some cause for concern (see Table 3). In the case of those who had taken up lecturing duties in the past 18 months, two thirds had no previous lecturing experience. For example, of the 11 respondents who were currently teaching large (200 +) lecture groups, 7 had no previous lecturing experience and 3 of these had neither lecturing nor tutoring experience.

Table 3. Previous teaching experience and current duties of One Year lecturing and tutoring staff. (NB. rows are not summative)

Current/Previous Duties Experience	None as lecturer	Neither tutor nor lecturer	No teaching at all
Large (200+) lectures (n=11)	7	3	1
Medium (50-200) lectures (n=25)	14	9	4
Small (<50) lectures (n=30)	20	9	4
Seminar groups (n=26)	19	10	5
Tutorial classes (n=50)	38	18	9
Problem solving classes (n=8)	8	3	2
Laboratory classes (n=22)	19	11	6
Other (n=9)	9	7	5

These findings are not remarkable given the traditional progression from undergraduate to research student, tutor and then lecturer, without formal pre-service training. An unexpected finding was the number of tutorial staff who listed lecturing among their teaching experiences since appointment (see Table 4).

Table 4. Lecturing experience of One Year Staff since their appointment to either the Lecturing or Tutorial staff.

	Lecturing staff n=27	Tutorial staff n=29
Lectured to large groups (200+)	8	3
Lectured to medium groups (50-200)	18	7
Lectured to small groups (<50)	20	10

Whether the lecturing experiences listed by tutorial staff referred to the occasional opportunity offered to them to lecture in the interests of their career development, or to responsibility for full lecture programmes is not clear from the questionnaire. One could view it as encouraging evidence of professional development opportunities for junior staff or as inappropriate delegation of responsibilities.

Given the range of duties expected of new staff, and particularly in the light of what we have discovered about their relative inexperience, it is interesting to consider the areas which they indicated were of concern to them. Thirty seven items were listed as being of potential concern to a new member of staff. The list was based upon that used by Fox (1981) in his study of new lecturers in English polytechnics. Staff were asked to rate each item from 1 to 3 according to whether the area was Of Appreciable Concern and they realised that they needed help in this area; Of Some Concern that is "help would be useful but you would be able to struggle through" and Of Very Little Concern meaning either that the area was "irrelevant or that they felt confident of being able to cope on their own".

The information was analysed separately for One Year and New Staff according to whether they were tutors or lecturers. A mean score was calculated for each item and ranked lists produced for each group. As a low mean score indicated relatively high levels of concern, the lowest ranking items for each group were selected for discussion (see Appendix).

The areas which appeared to be of most concern to recently appointed lecturers included obtaining research grants, understanding the organisation of the University and knowing administrative procedures. New lecturing staff were concerned to find out about what teaching resources (material, equipment) were available, how to maintain student interest in the subject and to be skilled in a range of teaching techniques. Whereas the One Year lecturing staff were more concerned with having enough time for preparation and with knowing the requirements for tenure and promotion. Other areas of concern to this latter group included knowing the theory of effective teaching and developing their own research area.

Tutorial staff were concerned to be skilled in a range of teaching techniques, to know administrative procedures, to know about new ideas in teaching their subjects, to develop and be competent in their research area and to know about promotion and tenure requirements. Newly appointed tutors were most concerned with having papers accepted for publication, knowing the theory of effective teaching, developing their research area and knowing what was required for promotion and tenure. The One Year tutorial staff were most concerned with learning to assess their own teaching and with other aspects of their role as a teacher (being skilled in a range of techniques, knowing the available teaching resources, administrative procedures and maintaining student interest). These ratings suggest that One Year tutorial staff were more aware of and concerned about their teaching than were New tutorial staff, whereas the reverse was true of lecturing staff. New lecturing staff listed a range of concerns related to teaching whereas the One Year lecturing staff appeared to be more concerned about organisational issues.

It is difficult to interpret such information and inappropriate to place undue emphasis on the differences, however one could have expected tutors and lecturers to have had more similar patterns of concerns if changes were related to increased experience and confidence in teaching. One explanation for the differences may be that One Year tutors are concerned and idealistic about teaching because they suffer the consequences of poor teaching without being in a position to do much about it. One Year lecturers on the other hand have had much of their idealism knocked out of them by the harsh realities of their first year.

In the light of these concerns it is useful to consider who advised and assisted New staff in their transition into the institution. Respondents were given a list of possible sources of advice and assistance and asked about their expectations/experiences in obtaining assistance from each in their development as academics.

Table 5. Degree of assistance expected/experienced from each of the following in developing one's role as an academic.

	Good deal		Some		Very little	
	New	One Year	New	One Year	New	One Year
	%	%	%	%	%	%
Senior colleagues	44	30	42	46	14	24
Head of School	38	21	41	32	21	47
Friends/peers	36	31	39	41	25	28
Educational Dev. unit	24	4	67	31	9	65
Professional Assoc.	-	5	29	9	71	86
Students	-	24	58	44	42	32

The information is presented to highlight the contrast between the expectations of New staff and the experiences of the One Year staff, although of course direct comparisons should not be made. New staff tended to expect more assistance from senior colleagues and their Head of School than was the reported experience of One Year staff. New Staff also held higher expectations of the educational development unit than were born out by the One Year staff. However as the number of One Year staff who reported "some" or a "good deal" of assistance from the unit roughly corresponds to the number from the survey who had reported attending workshops or seminars on teaching, offered by the unit, it suggests that those who received "very little" assistance had not sought it. Similarly, it may well be that the One Year staff (almost 50%) who reported "very little" assistance from their head of school had not sought it. However, this is not an adequate defence in this case as heads of schools have a direct responsibility to ensure that such assistance is available and offered to new appointees.

When asked about their attitude to staff development in the first year of appointment, most recently appointed staff (90%) expressed willingness to spend or to have spent some of their time engaged in such activities. However, in general, it was apparent that people would be more willing to spend time if their teaching and administrative loads were reduced to allow for such commitments.

Respondents were asked to indicate which of a number of time arrangements they would choose for their own professional development in their first year. The time arrangement categories were from half time, one day per week, one day per fortnight, half a day per fortnight, six two to three day sessions during non-teaching periods, no more than five days in total, no time whatsoever or other arrangement to be specified. Each respondent was asked to indicate which category they would choose if activities were to be conducted in their own time and then again which category they would choose if their teaching/administrative load were reduced to allow for such activities.

Table 6. Amount of time recently appointed staff were willing to spend on professional development activities

	New		One Year	
	Own Time %	Reduced Time %	Own Time %	Reduced Time %
Half time	-	5	-	-
One day per week	3	8	4	13
One half per week	8	8	15	30
One half per fortnight	10	5	17	8
Six 2-3 day sessions during non-teaching	5	11	13	19
No more than five days	39	40	42	25
No time whatever	18	16	6	4
Other	18	8	4	2

The median New member of staff was prepared to spend no more than five days in total on such activities, whether or not their workload were to be reduced to allow for such activities. Only 26% of the group were prepared to spend more than five days of their own time and even under conditions of reduced workload, only 37% were prepared to spend more than five days. It is instructive that One Year staff were more willing to spend time than were the New staff. A higher proportion (49%) were willing to spend more than five days of their own time on professional development, although the median was still five days. This group was willing to spend considerably more time on such activities if allowances were made in terms of their other workload. With reduced workload provisions, the median response of this group was half a day per fortnight and some 43% were willing to spend even more time. Less than 6% of the One Year staff said that they would not be prepared to spend any time whatever on such activities compared to 18% of the New staff.

Pressure of workloads may partly explain why, despite this apparently receptive attitude on the part of One Year staff, only 25% had, in fact, attended seminars or workshops in their first year. Indeed a number of staff commented on the difficulties of coping with a full teaching and administrative load when they were still trying to find their feet in their first year:

> I was given one month's lead time before my first lecture in which I had to set up two new courses that had not been offered before and involved 10 hours total student contact per week. That was in addition to attending new staff conferences, 'learning the ropes' and sorting out domestic arrangements since I had moved from interstate. Clearly, I should have had at least 3 months lead time - maybe I should not have had any teaching load during the first session or maybe only tutorial load where someone else had the responsibility of course content and programming. lecturer
>
> If programmed time was made over to going to courses - as it is pressure of preparation and conduction of classes, plus higher degrees leaves little time for attending courses. tutor
>
> Regular workshops given by [the unit] on above matters which the University recognises as part of teaching time (say 1-2 points for each hour attended) plus Workshops conducted by the School. As a tutor the requirement of a heavy teaching load plus the undertaking of higher degrees leads to an intolerable workload. Hence point recognition of hours spent doing a thesis or attending courses. Also regular meetings with Head of School to discuss tutors' problems. Tutors largely work in isolation. tutor
>
> The [unit's] program seems very good although giving up the time for it always is difficult at the last moment because of teaching, administration, buying a new home, new city etc. etc. ... pressures on new members of staff. Reducing the early workload would help. senior lecturer

Others suggested that a gradual induction into their teaching duties under the guidance of more experienced colleagues would have helped them to be more effective in their first year.

> Having a guiding hand in preparing lectures and also a chance to sit in some of the lectures I shall have to give.
>
> Be brought into the system gradually e.g. assist in a subject first and then lecture it the next time it is run.
>
> An opportunity to come into the job whilst there is someone else still responsible for the course i.e. to learn the ropes the easy way instead of the hard way. A more formal arrangement for 'in-School' training/advice for academic colleagues.
>
> Low initial lecture load; some instruction in the art of lecturing, tutorials, etc.

Some tutors were highly critical of the attitudes of some senior academics towards teaching and the allocation of teaching loads.

> Some interest by senior staff in my department in how and what I am actually teaching in my classes.
>
> More person-to-person contact with lecturers - it is always up to the tutors to chase them and ask questions about how to teach a subject - they should make more effort, not leaving notes in pigeon holes - this way you would feel more like they wanted to work with you rather than they had to!

> A little encouragement and guidance is necessary. Unfortunately tutors are looked upon as dispensable.

Discussion

A summary of the foregoing pages would probably hold few surprises for anyone involved in academic staff development. However it seems a necessary step to document the lack of previous teaching experience of the majority of our new appointees in the present highly competitive circumstances and to tabulate this with their current teaching duties. In addition New Staff's expectations of assistance from senior colleagues contrasts sadly with the reported experiences of the One Year staff.

We should perhaps view the findings concerning the time staff are willing to spend on professional development activities with some caution. If we take their responses at face value then the picture is very depressing. That New staff are willing to spend such a dramatically brief period engaging in development activities related to their academic role is hard to believe. It is interesting to speculate on how they interpreted the question. Did they take professional development activities to mean courses to improve their teaching? There are some cues in the questionnaire to prompt this view. If this were the case then our concerns change little: why should they be willing to spend such a limited amount of time devoted to improving abilities in teaching, something in which they are generally inexperienced and for which few have any training? If their responses were prompted by a view that courses and workshops would be ineffective, where did they gain this impression? It could not be from direct experience - the majority had had no contact with any provision of this kind - and those that had participated in such activities reported positively about it. One conclusion to be drawn is that the academic's role, particularly in teaching, is not one that new members of the profession believe can be developed in the kinds of ways suggested. Another conclusion could be that in the context of the conflicting pressures at work in their first year, staff are forced to allocate their priorities and for this type of activity they simply have no time.

The potential conflict between research and teaching responsibilities was evident in responses to a number of questions - for example the area of most concern to recently appointed lecturers was obtaining research grants, and for newly appointed tutors it was with having papers accepted for publication. Whether this is evidence of preference or a reflection of the pressures felt by young academics in the university environment may be illuminated by the following comments.

> Reduce the prestige value of research v. teaching. One feels defensive because though a good teacher, research is slow in forthcoming. This yields insecurity. (Perhaps people in opposite position feel same!)
> tutor
>
> Instead of totally relying on publications for appointments/advancement/tenure some credit should be given to teaching competence.
> lecturer
>
> Generally speaking and from looking around at people that are, like me, appointed as teaching fellow or casual tutors, there is a dilemma where

> to put more effort: into teaching or into research. Since most of us are here to do research in order to complete our Masters or Ph.D. theses the priority is naturally put into the research, and teaching becomes less important. So, even if there was information available, or help, in an organised form, unless it is made compulsory, I am doubtful how much use people would make of it. tutor
>
> The University should allow some staff to specialise in teaching - those with desire, proven application and skills - without such staff suffering when it comes to tenure and promotion. There is an over emphasis on research in all universities which I believe leads to an irresponsible attitude to teaching and to very poor teaching. Good researchers are not always the best teachers. tutor
>
> If a tutor spends the majority of his/her time becoming a competent teacher, the university seems to make no provisions for excellence in this area (without research), and this expertise seems to make little impact on selection panels for other academic positions. These issues are leading to a decline in morale in junior staff members who see very limited career prospects in academia. This is made more depressing by the continual loss of excellent, dedicated teachers amongst the tutorial staff who have reached the end of their 5 years term, whilst some tenured staff continue to be employed without performing even adequately in teaching or research - and yet they survive academia? tutor

The issue of where to put one's energy in establishing one's role-particularly for young academics - is clearly fraught with ambiguity stemming from conflicting messages about institutional values. In a study reported at last year's conference we demonstrated (Boud and de Rome 1983) the discrepancies between the emphasis which staff desired to be placed on teaching competence (very high) and the recognition which they perceived it received in promotion decisions (very low). Until the issue of the relative value of teaching versus research is resolved in universities, the tensions faced by new academics are unlikely to abate. However, even without tackling some of the more difficult political and philosophical issues, the findings of this survey indicate a number of steps at the organisational level which might be adopted to ease the transition of new staff into the system.

The reduction of teaching and administrative loads in the first year would allow for more time to be devoted to the development of courses. At the very least appointments should be made to allow new staff some lead time for the development of new courses. Realistically staff should take up their appointment at least one month before teaching begins; preferably, appointments should be decided in the previous year and dated from the beginning of the calendar year.

Even with such provision for lead time prior to the commencement of the teaching year, the time pressures on staff at that time suggest limited effective scope for the type of pre-service professional development programmes which have often been suggested. There would be some scope, however, for short survival-type activities on teaching to be followed by more systematic programmes after the first few months or so. Even apart from the usual pressures of changing jobs and possibly moving house, the beginning of teaching coincides with the time at which ARGS research grant submissions need to be prepared. New staff who want to establish themselves in research are thus under dual pressure at the very commencement of their appointment to produce and perform both as teachers and as researchers. Perhaps consideration should be given by ARGS to a later submission date for small grants to new researchers to relieve some of this pressure.

Other steps taken within the institution would require more fundamental changes. Given the traditional reluctance of academics to become at all involved in their colleagues' teaching, the responsibilities of senior academics for the development of junior staff need to be formally recognised and systematised. In particular the role of departmental heads in staff development needs to be defined. The results of the survey suggest that in fact departmental heads had relatively little involvement in assisting and advising new staff. The formalization of their responsibilities would not necessarily mean that heads of departments need to be personally involved in such activities but should certainly be responsible for ensuring that such support and assistance was supplied.

An example of a possible approach is through a system which provided all new staff with a mutually acceptable experienced colleague who would support them in their first few years and provide guidance and information about development activities available. A version of such a scheme was introduced in the United Kingdom with the AUT/UAP (1974) agreement on probationary staff, but for various reasons was not successfully implemented. Any version introduced in Australian institutions should make use of this experience and avoid the pitfalls which have been identified, for example, the lack of recognition and appropriate incentives for experienced colleagues. An additional way in which new staff can be assisted is through collaborative research projects, for example, by joining an existing research team, and through collaborative teaching. In the initial allocation of teaching new staff could be given joint responsibility for designing and conducting a course with another staff member with a reputation for excellence in teaching.

As responsibility for the professional development of new staff lies with their heads of departments, strategies such as those suggested are not only dependent on their support, but would most appropriately be their initiatives. This is not to suggest that there is no place for centralised staff development programmes, but only that such programmes should be seen as a resource for those who properly carry the responsibility for developing the human resources of the institution. A wide range of variations on this theme have been suggested over the years, however it is clear that the combined effects of work load and tradition render such initiatives unlikely unless firmly encouraged by institutional policy and procedures. This would require policy changes which until now have appeared unlikely in universities. However recent anti-discrimination legislation may be an unexpected ally. Requiring, as it does, equitable and accountable personnel management practices, EEO Legislation may be the stimulus for major changes in higher education's management practices, particularly staff development.

Although our respondents represented a reasonable proportion of the staff who had been recently appointed, the information discussed here is still only based on the responses of a small group of people from one institution. It is, at best, a glimpse at the process of academic socialization, but the image with which we are left is far from reassuring. At its worst we are presented with a picture of young academics competing for a limited number of positions and then feeling pressure to justify their appointment through research accomplishments while coping with teaching duties for which they are less than well equipped. Surely given the pool of talent from which we draw and recognising that it is with this that the future of higher education lies, it would be worth the effort to assist and support these people in integrating their personal goals and needs with those of the organisation.

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APPENDIX

Areas of some or appreciable concern

New Staff

Tutors

	Mean rating
Having papers accepted for publication	1.93
Knowing the theory of effective teaching	2.06
Developing your research area	2.07
Knowing what is required for tenure or promotion	2.07
Being skilled in a range of teaching techniques	2.13
Knowing administrative procedures	2.13
Knowing about new ideas in teaching your subject	2.13
Being competent at your research	2.13

Lecturers

Obtaining research funds	1.71
Knowing the administrative procedures	1.71
Understanding the organisation of the University	1.90
Knowing the resources of material and equipment available for teaching	1.95
Maintaining student interest in the subject	2.00
Being skilled in a range of teaching techniques	2.14
Knowing the theory of effective teaching	2.17
Knowing how to develop aims in your teaching	2.19
Understanding how students learn	2.19

Staff appointed in the past 6-18 months

Tutors

Being skilled in a range of teaching techniques	1.86
Learning how to assess your own teaching	1.86
Knowing the administrative procedures	1.89
Knowing the resources of materials and equipment available for teaching	1.90
Maintaining student interest in the subject	1.93
Developing your research area	1.93
Being up to date in your subject	1.93
Being competent at your research	1.93
Knowing what is required for tenure and promotion	1.97
Knowing about new ideas in teaching your subject	1.97

Lecturers

Obtaining research funds	2.00
Knowing administrative procedures	2.03
Having enough time for proper preparation	2.04
Knowing what is required for tenure and promotion	2.08
Knowing the theory of effective teaching	2.11
Understanding the organisation of the University	2.12
Developing your research area	2.15

METHODOLOGICAL ISSUES IN QUALITATIVE RESEARCH: LESSONS FROM A PROJECT

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The use of qualitative data has played an increasingly important role in educational research, and the social sciences generally, in recent years. The attraction of data of this type is that it offers researchers opportunities to gain insights into aspects of social phenomena which could not readily be illuminated by the older tradition of quantitative research methods which had been borrowed from the physical sciences. Qualitative data, however, pose severe problems of analysis and interpretation which remain largely unresolved despite the extensive body of literature devoted to their discussion and the reporting of studies which have attempted to overcome them (e.g. Bliss et al., 1983; Bogdan and Biklen, 1982; Friedrichs and Ludtke, 1975; Hamilton et al., 1977; Patton, 1980; Reason and Rowan, 1981; Stubbs and Delamont, 1976). This paper is a further contribution to this literature and presents a case study of an investigation which relied entirely upon qualitative data. In tracing the major steps in the conduct of the project we attempt to derive some methodological lessons from it.

Powell and Shanker (1982) examined the ways in which a university lecturer managed the progress of a course for which he was responsible. The aim was to identify issues which the teacher saw as problematic and, in general, to provide an account of the nature of the teacher's thoughts about the course and the ways in which these changed over time as he monitored its development and responded to classroom events. Tape-recordings of weekly interviews were content-analysed with the aid of a category system. In 1982 we extended this case study by gathering similar data, with some modifications, from seven members of the teaching staff. The interview format was changed so that each began with a period during which the teacher spoke about whatever came to mind in response to one single question and without any further prompts. This unprompted episode was followed by a number of questions relating to more specific aspects of teaching. The interviews yielded some eighty hours of tape-recordings and we were then faced with the task of implementing an effective way of analysing so much information.

The 1976 data had been processed by first identifying seven categories which emerged from the data after repeated replays of several interviews. The content of all interviews was then analysed into these seven categories by identifying the dominant topic being talked about during a speech episode (which might extend over a number of sentences). The length of each episode was measured by using the rev-counter on the tape-recorder: no transcripts were made so it was not possible to count words or lines. Thus the study established the approximate time spent by the teacher in talking about each of the seven content categories. The report on the study used these findings as its main base and drew on illustrative quotations to provide interpretative support and to enliven the presentation.

We had initially contemplated adopting the same approach in dealing with the new set of data, but at the first meeting at which the complete transcripts were available we decided that the sheer bulk of data would make such an approach very time-consuming and unwieldy, as well as being vulnerable to the interviewer bias which had been noted in the report on the 1976 study. There was also considerable doubt about the validity of any counting procedure as an indicator of the importance of each topic to the speaker.

A search of the literature drew our attention to the work of Sheffield (1974) who had suggested the value of trying to construct a "profile" of each teacher which identified his or her characteristic style of thinking about the task of teaching. As a result of the earlier study, and the structure which had been incorporated into the second part of the interviews, we already had a reasonably clear idea of the broad features which were likely to emerge from the data so we decided to focus initially on identifying the ways in which the teaching task was approached, the concerns which were most frequently raised, and the issues which were mentioned as being problematic. The profiles could then be compared in order to establish the differences and commonalities among this group of seven teachers and to construct a more general picture of what it is like to be a university teacher.

After examining several of the transcripts four broad areas of content were identified: course planning, teaching process, external constraints on teaching, and professional development. These were expanded into eight categories which were then used to code the complete set of transcripts of the interviews with one of the teachers. These eight categories were: initial course planning, on-going course planning, teacher role towards students, teacher role towards self, student role as individuals, student role as a group, external factors, and professional development. However, because of the diversity inherent in our sample of teachers, when this category system was applied to the transcripts of another teacher's interviews it became necessary to extend the range of each individual category in order to more accurately reflect what that teacher had been talking about. We decided to create a sufficient number of criteria governing the range of each category to enable every identifiably discrete component of the data to be noted. This led to the emergence of some sixty criteria some of which, of course, were only very infrequently invoked. This approach had some similarities to network analysis (Bliss et al., 1983) and reflected our concern to acknowledge the complexity of the data and capture as much of it as possible.

Coding was carried out over a period of six months and the transcripts were fully annotated with category codes. We decided, at that time, not to note the number of times a particular category emerged in any one interview and instead to characterise interviews by means of a "profile" or list of the categories that were represented in that interview. This provided a simple means of making comparative statements about the distribution of a category across the interviews of each teacher, and of making some gross comparisons for the group as a whole.

During the six months when the coding was carried out it was never possible for all members of the group to meet at one time and place. One was absent for the whole of this time and two others were away for lengthy periods. Pressure of other work resulted in the coding being done at irregular intervals. These factors combined to frustrate attempts to secure agreement on a number of issues. First, the meanings ascribed to newly emergent criteria could not be adequately discussed among the group in order that all could then apply the new criteria with the same meaning and, second, it was not possible at that time to periodically go back and search for these in earlier coded material. When the coding was complete, we made up summary sheets on which we noted those categories (and their constituent criteria) which appeared in each interview. These sheets also recorded whether the criteria occurred in the prompted or unprompted segment of the interview.

We were then faced with the problem of deciding on the ways in which the findings might best be reported. Five possible ways of proceeding were discussed:

(1) Use the category analysis and the resultant summary sheets as the basis for a report.
(2) Develop case studies which identify the characteristic concerns of each teacher and the context which brings these into play.
(3) Undertake a broader analysis which extends previous research into teacher thinking. This would focus, for example, on planning activities, decision-making during the progress of a course, and problems experienced by teachers.
(4) Adopt a staff development perspective by viewing the data as illuminating the reflective thoughts of teachers about their role and behaviour with a view to improving their own skills (Barrett and Powell, in press).
(5) Consider the methodological aspects of a research study of this type.

We were anxious to report some of the findings in the journal literature as soon as possible because, as far as we could discover, this was the first study of the ways in which university lecturers thought about their teaching activities and responsibilities. We therefore decided, early in 1983, to adopt a case study approach embodying the results of the category analysis. Preliminary portraits of three of the teachers were sketched indicating that this approach was both feasible and extremely useful. However, it became very apparent that any attempt to report the richness and complexity of the data in this manner would go far beyond the scope of a journal article. So we agreed to reserve this reporting format for a more substantial publication which would allow a fuller exploration of the many issues which had emerged as a result of our greater familiarity with the transcripts, and to concentrate first upon drafting a paper which would present only the most salient features of the data.

A preliminary draft of this paper was written and then work on the project came to a halt because of the absence of one member of the group and the pressure of other work. When work began again six months later we had our attention drawn to possible objections to some of the procedures we had adopted and we appreciated the need to deal with these. The two most important objections were inter-coder reliability and our method of assessing the relative importance of our various categories. These will be discussed in order.

(i) Reliability - when we initially began our analysis we had deliberately coded each other's interviews. However, it later became evident that only the researcher who had conducted the interview was able to give an accurate interpretation of some enigmatic (but important) points in the transcript. The resultant discussion, as interviewers/coders debated the coding decisions, tended to delay resolution of the issues.

(ii) It was mentioned earlier that as we coded the transcripts we noted only the first occurence of each criterion, that is in each interview a criterion was "scored" as either present (1) or absent (0). Consequently, it was not possible to infer from a "score" of (1) any indication of the relative importance of the criteria within that particular interview. For example, one person may have raised a point in a single brief sentence, another may have spoken about the same topic for several minutes, while another may have returned to it on a number of occasions. In each case that criterion received a score of (1) whereas it seems plausible to assume that the different speakers attached different degrees of importance to the topic. Against this, it might be argued that there may be some topics, although of great importance to the speaker, which are rarely ever mentioned. That is, volume and frequency of mentions of a topic are not reliable indicators of significance to the speaker. If one adopts this position then evidence on the relative importance of topics might need to be sought by the use of either linguistic or ethnomethodological methods. However, we chose to limit our present analysis to the range of content only.

It was decided to deal with both these problems by re-examining the first section of each interview during which the speaker had not been responding to interviewer prompts. This element had been introduced into the design of the project in order to obtain material which reflected the teacher's thoughts free of any possible distortion by interviewer intervention, the assumption being that if a topic was raised spontaneously it was unlikely to be an artefact of the interview but would tend to reflect the current concerns of the teacher.

The original coding of this material was first checked by another member of the group and it was then decided to apply a quantitative measure to the data. A line count was made for each item scored in order to see if there was any difference between frequency of topic mention and the amount of time devoted to discussion of each topic. It was found that insofar as each might be used as an index of the significance of the topic there was very little difference between the two. This reassuring evidence gave us confidence that our earlier decision to create "profiles" by only noting the first occurence of criteria in any one interview may not have misrepresented the data. In these interviews it appears that topics which are frequently mentioned over a series of interviews are also those about which the teachers talk longer.

A further issue has occurred more recently as we have re-examined some of our original criteria and we have agreed to omit those which could be subsumed under other headings. Without basically changing the original categories we have rearranged our criteria into groupings which we think might more accurately reflect the major concerns of the teachers. The debate continues!

Looking back over the project now, it seems that we began with a reasonably clear, if rather general, set of ideas about what we were looking for in the data. These were derived from the results of the earlier case-study, our own understanding of the nature of teaching, our consultancy experience with teachers of this kind, and our views on what might be of interest when teachers talk about their work. Those ideas influenced the design of the project, the way the interviews were conducted, the construction of the category system, and the interpretations of the transcripts. In order to extract meaning from the transcripts we attempted to identify what appeared to be significant to the teachers who talked to us about themselves. These impressions were a composite of our weekly experience of interviewing and our interpretation of the transcripts. The very limited range of quantitative procedures which were applied to this qualitative data was useful either to confirm or bring into question these impressions, and to help us ascribe some notion of relative significance both across the categories and from teacher to teacher.

The project was conceived as an extension of the earlier case-study but because the new data were obtained from seven people with very diverse backgrounds, teaching different subjects in a variety of formats, the previous study had ill-prepared us to handle the complexity of the material which was obtained. It is worth pointing out that most previous studies of teacher thinking have been of much more limited scope (Clark and Peterson, in press). Even the work of Elbaz (1983), which most closely resembles our own in approach, was based on only five interviews with a single teacher. In our own case, the large number of interviews, their frequency, their loose structure and the fact that the teachers had complete control over a portion of each interview, had produced accounts which were extremely wide-ranging in character. In addition to providing more routine information concerning day-to-day course management activities, we also believe them to be revelatory of crucially important values, attitudes, beliefs and theories. Throughout the study we have been acutely mindful of the need to respect the integrity of the data and to report it in a manner which does justice to its richness and highly personal qualities.

Perhaps the most productive way for us to reflect upon our work on the project is to consider what we might do differently if we were beginning again. The lessons which might be derived from this project relate to three major areas: (i) the design of the study, (ii) the data-gathering procedure, and (iii) the analysis of the data. We shall comment briefly on each of these.

(i) The project was designed largely in terms of an expansion and follow-up of the earlier case-study of a single teacher. This expansion introduced one most significant new factor which added to the problems involved in interpreting the data, namely the variations within the group of interviewees. They were of diverse age, experience, background, beliefs about teaching, disciplinary field, and methods of teaching. If we were beginning again we would probably decide to limit this diversity in the interests of obtaining more readily interpretable data.

A second factor in the design was the fact that four people were involved in the conduct of the project. Using a team of researchers may raise differences of opinion about how a study should be conducted and these must be resolved at an early stage. An instance in our case was lack of agreement as to what constituted the distinction between quantitative and qualitative approaches to data. If we were carrying out a similar study again, one option would be having one person carry out all the interviewing and coding. Many problems would thus be avoided or greatly reduced in scope but on the other hand, this would delay the completion of the project very considerably.

Third, some of the interviewees were known to us before we started the project and we got to know the others quite well during the course of our interviews. While this inevitably influenced the interpretation which we placed upon what they said we can think of no good reason why we should have attempted to clear our minds of this knowledge as we read the transcripts. There are obvious advantages in having additional knowledge when attempting to interpret what people say. In addition, an approach to complete strangers may make it difficult to persuade them to make time available for interviews.

(ii) In conducting a similar project we would control the data-gathering phase more tightly in order to ensure consistency. We would check, in particular, that everyone covered all areas of the interview schedule. Meetings would be held to compare the progress and approach of each interview. Records would also be kept of each interview by making notes immediately afterwards about how it went: these could be helpful for purposes of interpretation.

(iii) The analysis of this type of data presents many difficulties. The use of a category system which is largely emergent rather than entirely pre-conceived, requires meetings to consider and agree upon the content of categories. These must be regular enough to ensure the creation of an agreed system which can then be used to code all of the transcripts as early as possible. It could be argued, of course, that with data of this type the use of a fine-grained category system is inappropriate and a more impressionistic portrayal of its main features should be attempted. This would certainly be less demanding on resources and perhaps might produce results in a shorter time. It would also be useful, after the completion of the interviews, to generate some preliminary broad interpretations and check these out with each teacher before proceeding further.

All of these issues and proposals are controversial, some much more so than others. But this is to be expected when we are dealing with highly complex material of this nature in the absence of any well-established procedural guidelines. Hence this paper!

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EVIDENCES OF HUMANISTIC EDUCATION IN VOCATIONALLY ORIENTED AND OTHER AUSTRALIAN UNIVERSITY DEPARTMENTS

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INTRODUCTION

The purpose of this paper will be to examine some of the foundations of humanistic psychological and educational thought, and then to provide some empirical data concerning the way in which Australian university teachers in vocationally oriented departments, particularly Civil Engineering, Law and Medicine, respond to items and scales that would purport to measure aspects of humanistic educational orientation. Much of the data will be concerned with matters of liberal education and social responsibility which are integral to humanistic education and are highlighted as a conference theme, but the opportunity will be taken to make a fairly wide-ranging assessment of vocationally oriented departments on a range of humanistically oriented criteria, and to make this assessment more meaningful and interpretable by the provision of comparative data from a number of other departments which are less obviously vocationally oriented.

The data used in this paper were gathered in a major study of university teaching in Australia (Genn, 1982), and refer to a period now a decade ago. The findings to be presented largely represent a new analysis and synthesis of those data that entailed departmental comparisons, and are novel to the extent that this work allows departments to be viewed in a way that was not readily possible before. The findings here are also novel in that some of them have not previously been reported. It is assumed, without strong assertion, that these data about the state of the departments, vocational and other, is pertinent today. Certainly such data have historical significance, as a window on the seventies and a base-line for any studies of a follow-up kind that might be made.

THEORETICAL ORIENTATION

Foundations of Humanistic Psychology and Education

These foundations have been provided by such psychological theorists as Maslow (1954, 1962, 1968), Rogers (1961, 1969), Matson (1971, 1973), Combs and Snygg (1959), Combs (1979), Combs et al (1977), and Adler (1958), and elaborated by educational theorists like Goodlad (1974), Zahorik and Brubaker (1972), and here in Australia by Stanton (1975). Recourse to such literature reveals ever-recurring themes in foundational thought in humanistic psychology.

The uniqueness and infinite worth of each human individual is a basic fact and tenet of humanistic psychology. Human beings are viewed as being of basically good moral nature and as striving to achieve the very best they might become, in the process of self-actualisation. In particular, the individual is striving, and needs help in the striving, towards a tri-partite kind of awareness, whose parts Pace (1969) has called personal, poetic and political, respectively. Personal awareness would entail the individual's self-awareness, of who she or he is, and awareness of life's meaning and purpose and plan. Poetic awareness is akin to aesthetic sensitivity and involvement in creative activities and appreciations of art, music and literature. Political awareness characterises the individual insofar as he or she recognises social responsibilities and contributes to the welfare of micro and macro societies that surround. Apart from the proclaimed uniqueness and infinite worth of each human being, perhaps the most significant tenet of humanistic psychology is that all humans deserve and need unconditional acceptance by others. All persons need to be trusted and need to be loved. They need the support of a loving, caring, sharing community, where cooperation is the basic social process, and where equality amongst members is taken for granted, in a non-authoritarian climate. If all goes well in the care and nurturance of human beings, they will, according to humanistic psychologists, be characterised increasingly by venturesome, risk-taking ideas and behaviours, that are radical and creative, and critical of aspects of the society that handicap or impoverish human development. The truth will be fearlessly followed, wherever it may lead, and such a search will issue in achievements in the world of ideas and feelings, and in the material world.

Conceptualising the Nature of University Departmental Differences

Benezet (1973) has referred to universities attempting to achieve three relatively distinct, although certainly not independent, kinds of goals. These goals have been described in terms of fostering the development of students in three domains, viz. academic excellence, personal identity and social utility. This is, if you like, a three-way split of the university into departments, which would be grouped according to whether they saw themselves as predominantly concerned with the first, or the second or the third of these goals. The humanistic educator would certainly be at home with the "personal identity" emphasis but would need to specify the elaborations of "academic excellence" and "social utility" to ensure they accorded with the spirit of humanistic thought.

For a considerable time now there has been discussion of Snow's Two Cultures (1959), where the contrast is made between Science and Arts-Humanities studies. Humanities here refers to studies that are focused on the life of man and on making this a good and noble life of the intellect and the spirit, where human feelings and conduct, gentleness, consideration and good manners are emphasised (Woodhouse, 1970). For some reason that may well appear rather odd, particularly to science educators, these worthy outcome behaviours are alleged to be fostered strongly by some university departments and not much by others, with the Arts-type departments in the ascendancy, and the Science-type departments scoring lowly in these important regards. If the dichotomy is as real and wide as the Two Cultures literature affirms, then the humanistic educator would almost certainly be more at home in, or more likely to be found in, the Arts-Humanities departments.

A third important conceptual basis for our consideration revolves around the ever-present debate concerning the alleged conflict between Vocational and General (or Liberal-Cultural) Education. Conant's formulation, along with the Harvard Committee, of the problem and issues is still valid (Harvard Committee, 1962: V-X, 51-58). Not surprisingly, vocational educators would emphasise Benezet's "social utility" goal (1973). In this case, and assuming finite resources, perhaps it would not be surprising if "personal identity" did not loom as large as in departments not manifestly vocational. In the search for "social utility" it could well be that instruction, for example, was more "task" than "student" centred, more concerned with serving society than criticising it, more concerned with fostering uniformity than idiosyncrasy, more directive than non-directive, more authoritarian than liberal, more concerned with convergent than divergent thinking. This adds up to a picture of vocational education where the doctrinaire humanistic educator would perhaps not be very comfortable, and where there would be much to criticise, especially if relative lack of emphasis on humanistic criteria was equated, almost certainly incorrectly, with "no emphasis". Clearly, too, the forces causing division, and perhaps divisiveness, in the university, between Vocational and General Education, are often confounded with other forces stemming from the Science Vs. Arts dichotomy, especially when some and perhaps most vocational departments are science-based (e.g. Medicine and Engineering), while not forgetting the converse, as in the case of a vocational department like Law.

As a further complication, we should note here that "vocational" departments might be classified according to the extent to which they prepare students for the so-called "helping" professions. For such "helping" professions, a simple expectation would be that the corresponding departments would be "people-oriented" and to that extent humanistically oriented. In this present study, with a focus on the departments of Medicine, Law and Civil Engineering, this ordering of the departments might coincide with their ordering as "helping", "people-oriented" departments.

Empirical Evidence Relating to Inter-departmental Differences

In addition to using the conceptual themes we have been considering as aids in classification of departments according to criteria residing in humanistic educational principles, there is more directly usable empirical evidence available, in comparisons of departments on the basis of their educational environments, particularly as embodied in the psychological needs of their students and the social-emotional-intellectual climates or press [Pace (1964, 1969), Stern (1970), Astin and Holland (1961), Astin (1962, 1965), Thistlethwaite (1962), Vreeland and Bidwell (1966), Baird (1974)]. This kind of literature can be read for its relevance to humanistic educational thought. For example, Stern (1970) indicated interesting and predictable personality differences (needs dispositions) among students in departments that could be classified as Arts, Science, Vocational. Pace (1964), for example, generalised many of his environmental press or climate findings in a statement to the effect that Science-type environments, in contrast with those in the Arts-Humanities, emphasised privacy more than community, and "things more than lives". Astin and Holland (1961) characterised higher education environments in terms of proportions of students in the various vocational streams, basing their work on Holland's theory (1973) that certain personality types find their way into certain vocational streams and constitute the most salient aspect of the educational environment there. Pertinent here are such researches as those of Hearn and Moos (1978), and of Steele, Walberg and House (1974), dealing with climates or press in various high school subject departments. Note also the literature on values characterising individuals who find their way, as teachers or students, into various university departments (Feather, 1972).

Predicting the Humanistic Orientation of University Departments

In the foregoing analysis of problems in conceptualising the nature of university departmental differences, some indication has already been made of what would probably be the educational manifestations of inter-departmental differences, particularly humanistic educational manifestations. Also, in the empirical evidence already available about inter-departmental differences, there are some strong indications about how various Australian university departments will score on humanistically oriented educational criteria.

In summary here, the prediction would be that Arts-Humanities type departments would, in general, be more likely to come out highly on humanistic educational criteria than Science-type departments, and that the obviously vocationally oriented departments would score lower on such criteria than less obviously vocationally oriented departments. However, the fact of confounding of the Arts-Humanities Vs Science classification with the Vocational Vs General Education classification complicates matters of prediction somewhat, when, say, a Law department is simultaneously vocational and based in Arts-Humanities, and a Civil Engineering department, say, is simultaneously vocational and science-based. Logically, a vocational science-based department should come out relatively low on humanistic criteria. A further complication, still, is that within the vocationally oriented departments, degree of humanistic orientation will probably be related to the extent to which the corresponding profession may be described as "people-oriented", "caring" and "helping". On this basis a vocational, science-based department preparing for a profession not categorised as "people-oriented", "caring" and "helping", will almost certainly come out low on humanistic orientation.

We have so far considered confounding of the two major bases of departmental division (Arts-Humanities Vs Science, and Vocational Education Vs General Education), and the matter of vocational departments as being linked with professions that are describable as being more or less "people-oriented", "caring", "helping". We must also emphasise that no department is solely vocational or non-vocational, that some departments fit rather awkwardly into the Arts-Humanities Vs. Science divisions, and that no vocationally oriented department could be linked with a profession that was not substantially "people-oriented", "caring" and "helping". With these provisos, we might expect that difficulties of neat and unambiguous predictions will be considerable in number, if not legion.

METHODOLOGY

The data were derived from university teachers of all ranks (Professor to Tutor) in 10 departments, viz. English, French, History, Mathematics, Chemistry, Zoology, Economics, Civil Engineering, Law and Medicine, across six universities constituting a representative sample of Australian universities (Genn, 1982).

Information about university teachers' perceptions of the importance of various university goals was collected via responses to eight separate items. Items were categorised as consistent or otherwise with humanistic educational principles, and departments were assessed as High, Medium and Low on each humanistically oriented item, or each non-humanistic item reversed, where High meant being in positions 1, 2, 3, Medium meant being in positions 4, 5, 6, 7 and Low meant being in positions 8, 9, 10, when the 10 departments were ordered as to their position on each humanistically oriented item or each non-humanistically oriented item reversed. The items used were as follows: "Prepare people for useful occupations" (reversed); "Transmit basic cultural values"; "Develop a person's self-awareness"; "Enrich the student's life, culturally"; "Serve as a critic of the society"; "Promote understanding among different peoples"; "Assist students to develop critical thinking abilities"; "Encourage students to be intellectually innovative".

Similar procedures were invoked for five items pertaining to university teachers' perceptions of the ideal importance of various matters pertaining to judgments of excellence in the academic profession, and hereafter called *ideal academic criteria*. Items used were as follows: "Teaching performance"; "Publications" (reversed); "Student evaluations"; "Service to the community" (reversed); "Committee and other administrative service" (reversed).

As for *attitudes to the teaching role*, again similar procedures were employed, with basic data deriving from scores on six scales, named as follows: "Negative attitude to students" (reversed); "Hovering concern"; "Warm"; "Non-improvable" (reversed); "Conventional strategies" (reversed); "Elite preferences" (reversed). (Because some of these scale names are rather esoteric and vague, it should be here noted that "Hovering concern" measures the extent to which teachers believe they should urge students to work and should accept responsibility for students' progress, "Warm" measures the extent to which teachers are warmly disposed and friendly towards students, "Non-improvable" measures the extent to which teachers believe that there is little that can be done to improve teaching, "Conventional strategies" measures the extent to which conventional and conservative teaching methods are deemed desirable, by the teachers, and "Elite preferences" measures the extent to which teachers prefer to engage in the kinds or levels of teaching that might be regarded as attracting greater status.)

Concerning *environmental press* which university teachers seek to establish in their classes, basic data derived from scores on five scales, each measuring a particular press or climate dimension, as set out below: "Scholarship"; "Practicality"; "Community"; "Awareness"; "Propriety" (reversed). (Because some of these scale names may be a little unclear in meaning, note that "Scholarship" press is established to the extent that scholarly, intellectual and academic pursuits are fostered, "Practicality" press is established to the extent that there is concern for the pragmatic and the practical, and for business-like efficiency, "Community" press is established to the extent that there is concern for the fostering of friendliness and a sense of community, between teacher and students, and among students, "Awareness" press is established to the extent that there is concern for the fostering of a sense of personal identity, of aesthetic expression, and of a sense of social responsibility, and "Propriety" press is established to the extent that there is an emphasis on the environment's being a polite and considerate sort of place, where "proper" behaviours are called for, and where there is some emphasis on taking note of rules and regulations.)

Concerning *undergraduate instructional activities*, only one item was used, viz. "Endeavour to learn the names of students".

Concerning *academic involvement*, three scales were used, viz. "Improvement of undergraduate teaching"; "Working with students out of class"; "Productivity" (research and other scholarly output) (reversed).

Concerning role preferences, four items were used, viz. "Teaching undergraduate students"; "Supervising thesis work of honours, masters and doctoral students" (reversed); "Pursuing own research and writing" (reversed); "Activities linking university to community" (reversed).

Concerning satisfaction with teaching, this was measured by a scale called "Morale: Satisfactions (with undergraduate teaching)".

The last matter of interest was academic freedom, measured by one item, viz. "Without academic freedom I think I would be a much less effective teacher."

Note that for all the scales or items on which departmental differences are to be reported, there were statistically significant differences among the departments, on the particular scales or items, at P = .05 level. It is particularly important also to note that differences among departments on items or scales are conservatively estimated. This means that any departmental differences in composition by status, sex, age, prior school-teaching experience or university, are essentially controlled or removed, and that the departmental differences reported, for items or scales, are unconfounded by the effects of those other variables of status, sex, age and the like, just noted.

Note also that there is no strongly confident claim made here for the correctness of classification of an item or scale as being consistent or otherwise with educational principles that reside in humanistic psychology. It is clearly debatable to say, for example, that a high score on Productivity, as an aspect of academic involvement, or a high score on "Prepare people for useful occupations", as a university goal, or a high score on "Publications" or "Service to the community", or "Committee and other administrative service", as ideal criteria of academic worth, is essentially inconsistent with a humanistic orientation, or, more carefully stated, less consistent with such an orientation than a low score. Similarly, it is highly debatable that a high score for "Conventional strategies" as an attitude to the teaching role, or for the environmental press for Propriety, or for the role preferences for "Pursuing one's own research and writing" or for "Activities linking university to community", is less consistent with a humanistic orientation than a low score, on the respective scale or item. All that is being said is that, on balance, the item or scale appears to be keyed in the way being stated here, when such an item or scale is assessed in the full context of humanistic psychological and educational thought. Neither, and this is very important, is there any suggestion here, or elsewhere in this paper, that humanistic orientation is equivalent to truth, beauty and goodness, and that a less humanistic or non-humanistic orientation is something to be viewed as unworthy, ignoble, or otherwise inadequate.

FINDINGS

Altogether, departments have been ranked 34 times, and for each ranking they have been described as High, Medium or Low, depending on how they scored on an item or scale that purported to measure what has here been called a humanistic orientation. Shortage of space precludes the presentation here of detailed data, for departments, for particular items or scales of the various domains, or for each of the separate domains as a whole. The aggregated data based on the 34 comparisons is presented in Table 1. This table cannot, of course, take any account of what might be termed the relative importance or significance of issues represented by particular items or scales.

Table 1: Frequence of high, medium and low scores on humanistic criteria

Department	High	Medium	Low
English	23	9	2
French	18	12	4
History	27	4	3
Mathematics	1	20	13
Chemistry	0	16	18
Zoology	7	18	9
Economics	11	20	3
Civil Engineering	2	7	25
Law	7	18	9
Medicine	7	11	16

For the frequency data in Table 1, chi-squared = 151.08, df = 18, P = .0000, which indicates a statistically significant relationship between department and humanistic scoring pattern, overall.

In order to provide a final ranking of departments on humanistic orientation, a rating of High is given 3 points, Medium is given 2 points and Low, 1 point, for each of the 34 departmental comparisons. Ranking of departments is as follows, in Table 2, with total points score also indicated.

Table 2: Humanistic orientation

Department	Total Score	Ranking
History	92	1
English	89	2
French	82	3
Economics	76	4
Zoology	66	5 (equal)
Law	66	5 (equal)
Medicine	59	7
Mathematics	56	8
Chemistry	50	9
Civil Engineering	45	10

Thus, from this table, the following general observations might be made:

1. Arts-Humanities departments emerge as more humanistically oriented than the Science and vocationally oriented departments.
2. An Arts-Humanities based vocational department (Law) scores higher than Science-based vocational departments such as Medicine and Civil Engineering.

3. Vocational departments (Law and Medicine), that are linked with "people-oriented" professions, score higher than a vocational department (Civil Engineering) that is linked with a profession that is apparently less "people-oriented".

Detailed comparisons of departments were also made, where each department was compared to every other department, in terms of the probability level for the statistical significance of the difference in humanistic score between the department and each of the nine other departments. Set out next are inter-departmental differences which did and did not reach the level $P \leqslant .05$. English is different from all other departments except French and History. French is different from all other departments except English and Economics. History is different from all other departments except English. Mathematics is different from all other departments except Chemistry, Zoology, Civil Engineering, Law, Medicine. Chemistry is different from all other departments except Mathematics, Zoology, Civil Engineering, Medicine. Zoology is different from all other departments except Mathematics, Economics, Law, Medicine. Economics is different from all departments except French, Zoology, Law. Civil Engineering is different from all other departments except Mathematics, Chemistry. Law is different from all other departments except Mathematics, Zoology, Economics and Medicine. Medicine is different from all other departments except Mathematics, Chemistry, Zoology, Law.

SUMMARY AND DISCUSSION

The following matters appear worthy of note:-

1. This research provides evidence that, among university departments, there are some clear differences in the extent to which departments are characterised by a humanistic orientation in their teaching.
2. The prediction of degree of humanistic orientation characterising university departments was successful, to the extent that the ordering of the departments essentially coincided with that which would have been expected on the basis of what is known conceptually, and from previous research, about inter-departmental differences.
3. The vocationally oriented departments (Civil Engineering, Law and Medicine) have, in particular, been assessed for their humanistic orientation and have been placed in positions, relative to one another, and to other departments, consistent with theorising and prior research.
4. Such findings about vocationally oriented departments should provide partial answers, at least, to the conference sub-theme, that raised discussion of matters of liberal education and social responsibility in vocationally oriented departments.
5. While the categorisations of teacher attributes and behaviours as consistent or otherwise with what has been called a humanistic orientation are defensible, by reference to basic tenets of humanistic psychology and education, such categorisations might reasonably be debatable in a number of instances.
6. The attempt to re-ify the tenets of humanistic psychology and education in measurable attributes and behaviours of university teachers constitutes a novel, if tentative, attempt to apply humanistic psychology to problems of teaching and learning in higher education.
7. No suggestion is made or implied that humanistic orientation is synonymous with virtue and goodness, or that ordering of departments on degree of

humanistic orientation is equivalent to an ordering in terms of quality or excellence.

8. While the data on which empirical aspects of this paper are based are now 10 years old, it is suggested, but not asserted, that findings of any similar current study might be very similar to those reported here.
9. The findings may serve as base-line data, against which future findings may be compared, and may also serve to stimulate replications of this study, to enable the checking of its findings.

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OLD WINE INTO NEW WINESKINS: FOREIGN LANGUAGES AT THE UNIVERSITY AND IN THE MARKETPLACE

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Over the last decade or so, the statement that foreign languages are in a crisis both at school and in the Universities has once again become widespread. This is not new, at least not in Anglo-Saxon countries who have always tended to view anything foreign, including foreign languages, with suspicion.

There has been a fair amount of introspective analysis of the 'problem' by foreign language teachers amongst themselves (1) as well as some well-meaning advice from academics outside the language teaching profession.(2) What has been lacking up to now, at least as far as I can see, is a constructive dialogue between foreign language teachers and education professionals in other disciplines. My paper is intended to be a contribution towards such a dialogue, insofar as it seeks to set out the rationale for the activities of one language teacher, to describe the problems faced by foreign language teachers, particularly at university, and to outline one solution for these problems which appears to show promise.

Let me begin with some questions that are frequently put to me by intending students and by members of the community at large. They ask me why one should study foreign languages at all, in view of the present employment situation and in view of the fact that English appears to have become the lingua franca of the western world anyway.(3) They ask, what can you do with a degree in languages if you don't want to teach. They ask whether one year at university is not enough to learn the language sufficiently well for basic communication. Why should they do three years? Students entering their second year ask me why they have to study literature to graduate as a BA with a major in German. They don't want to study literature. Why can't they obtain a major with language alone?

These questions are revealing. They show an attitude to foreign language study that would not be shared by most university teachers of languages. Indeed, they touch on the very basis on which my training, and that of most of my colleagues, is founded. With rare exceptions we are trained in literature, not language. This appears to be the pattern throughout Australia and New Zealand, no matter what the language. Apart from some 'service departments', which teach language only, all major foreign language departments in this part of the world, as well as in Britain and America, see themselves as language and literature departments, with Linguistics as a major option in some of the larger ones. The number of straight language acquisition courses generally do not amount to more than at most a third of their total course offering. The teaching of language is seen by many as a necessary chore often relegated to the junior staff members. The major and important task of the department is the study of literature or linguistics.

So one problem, perhaps the major problem that teachers of foreign languages at Universities face is that their basic aims, as far as they are formulated at all, appear to be at variance with the aims and expectations of the 'consumers'. (4) The students and society at large have expected direct vocational relevance; we, on the other hand, have insisted on providing courses which, while certainly valuable, cannot be seen as directly relevant to any vocation except perhaps teaching literature or linguistics at University level.

Teachers of foreign languages have always acknowledged the vocational utility of their subject. They have, however, seen this utility in broader contexts than simply the application of the linguistic skill. J. T. Roberts defines this wider, educational role of foreign languages as follows:

> By educational role I mean...that of helping young people to think clearly, to develop balanced and socially adjusted personalities, to exercise manipulative skills, to undergo cognitive growth, to acquire conceptual awareness, to see into other societies and to see their own language and society through the eyes of foreigners...The educational role as here elucidated is,in effect, an amalgam of the traditional roles of educational language study throughout the ages and is, all said and done, the role proper to education as opposed to vocational training.(5)

Most of the points made by J. T. Roberts would apply to studies in literature as well, with the addition, perhaps, of the development of analytic thinking and aesthetic judgement.

The questions which the students ask and the issues which they raise have forced me to take a long hard look at what I and my colleagues are doing. If we are not meeting the expectations of our students and the community, have we become an anachronism in the contemporary university scene? Should we perhaps abandon the emphasis on literary and linguistic studies and concentrate solely on the teaching of language skills?

I propose to answer this question, as well as some of the questions which my students ask, firstly by briefly discussing some aspects of foreign language teaching which appear to me to be important. I will then attempt a defence of the teaching of literature before addressing the question of the employability of our language and literature graduates. Finally, I intend to report on a new combination of courses at our university which safeguards the teaching of language and literature while at the same time meeting perceived vocational needs.

Ever since the first educational institutions were founded in Europe, second languages have had an important part in their curricula. Partly this was because of vocational necessity (after all, Latin was the lingua franca of the church and of scholars in general), but second languages were also taught because of their perceived educational value. It is between these two poles - vocational necessity and general educational value- that the pendulum of justification for the teaching of foreign languages has swung. At the moment we appear to be in a phase where a very narrow view of vocational relevance seems to have the upper hand in many curriculum debates.

The reason why training in language has for many centuries been at the centre of a humanistic education is that it provides training in the understanding and development of concepts. Language is not only a discipline in itself, but also the base on which our whole understanding of ourselves and our environment rests. If we add to language training some basic competence in Philosophy and

History, we have a programme of study that enables the student to understand and develop concepts, to critically examine them, to see how they have developed and changed over time. For this reason language training, particularly training in a second language, has been and still should be at the centre of an integrated and consistent programme of studies, both at school and at university. This view, however, appears to be at variance with educational developments over the last two decades. The current smorgasboard approach to education, particularly in what is termed 'liberal studies', combined with a curriculum which appears to be increasingly vocational in orientation, seems to me to be ill-founded. In it, the students take small units of a large number of subjects, in which they are not and cannot be shown the links between areas of study that unite them into an organic whole. I would argue that this approach to education, in which students, particularly at high school level, 'do' a little bit of this and 'sample' a little bit of that without ever being asked to spend a considerable proportion of their time and effort studying an area in depth over several years, produces people who, when they leave school, have neither knowledge nor wisdom. What is worse, they are not trained and equipped to obtain it.

Over the last few years, all the new subjects introduced into the New Zealand high school curriculum, where they compete with traditional subjects like foreign languages, have either had a vocational bias (Economic Studies, Computer Studies, Horticulture), or else they have been watered down prescriptions of traditional subjects. Classical Studies may be described as Latin without the requirement to learn Latin. If we at the universities continue this trend and channel more and more of our resources into simply meeting the demand of the market place by training specialists, then I would submit that we have abdicated our educational responsibility.

Learning a foreign language is a hard, exacting discipline that demands tenacity and application over a long period of time. Research has shown that for most students in countries like Australia and New Zealand a minimum of 700 - 1000 hours' instruction is needed to give a person basic competence in a second Indo-European language.(6) Most people who have never learned a foreign language, and this includes many of my colleagues at university, appear to have been the victims of what can only be described as misleading advertising by some commercial enterprises which promise to teach foreign languages instantly, without any hard work, to their unsuspecting customers.(7) The propagation of such attitudes has led to a devaluing of foreign language learning as a discipline; it has also led to unrealistic expectations about what degree of competence can be achieved in a certain time. These attitudes and expectations make it imperative that we, the language teachers, clearly state the requirements and the goals of our subject at whatever level we teach. The great danger for us is that we attempt to woo students by watering down our courses, or to put it bluntly, by lowering our standards. This would be fatal to foreign languages as a University discipline. Unless we maintain high standards, we will lose our credibility in the academic world.

It is the narrow vocational f[illegible] in our school system that has produced the misconception that a degre[illegible]eign languages is a vocational degree which is designed to be 'used' i[illegible] way in which a degree in Architecture or Dentistry is 'used' in the [illegible]place. We all know that nothing could be further from the truth. Only a minority of foreign language graduates in Australia and New Zealand will spend their professional lives 'using' their acquired language skills on a regular basis. What they will use are the skills which they have acquired through the medium of foreign language: the ability to handle concepts, the awareness of linguistic codes, the mental discipline to apply themselves to a problem and stick with it until it is solved. They have the advantage of having been trained as well as educated: trained in a rigorous and exacting discipline, and educated in the humanist sense of the word. A degree in foreign languages is not and was never intended to be vocational training, but rather a sound education which produces graduates who are eminently trainable and employable.

One area which appears to be under attack in foreign language departments at present is the teaching of literature. As I have pointed out at the beginning of this paper, students in most foreign language departments must study literature if they wish to graduate in a particular language. Foreign language graduates will thus have spent a considerable proportion of their university time studying such 'useless' topics as 12th century French lyric poetry or 19th century German drama. Are these subjects really as useless as many of our critics seem to believe? I would like to affirm the value of studying literature in the context of the university and society. It is the only art form that makes use of a basic skill which we have all acquired. Some of us may be tone-deaf, others may not be able to draw or paint, but we have all learned to handle language and need to handle it if we are to have any social or professional contact at all. In an age in which language has become increasingly devalued in the service of commercial and ideological propaganda, it is, in my view, of the utmost importance that we continue to produce graduates with a critical awareness of the art form which takes the use of language to its limits. I further submit that literature, in terms of the human values and insights which it transmits, is more than ever important and necessary in an age and in a society that is increasingly dominated by machines. Such considerations may sound idealistic in a context where the harsh realities of the marketplace appear to rule. And indeed, if these realities are the only criteria for the choice of disciplines to be studied at a University, some of the critics may well have a point. Cohen and Joy, for example, see the teaching of literature as elitist and irrelevant to our society. They claim that 'artistically serious literature has become the province of a minute cultural elite'.(8) This is nothing new. It has almost always been the case. It is however no argument for discontinuing the teaching of literature, provided we continue to accept it as a worthwhile discipline and provided we continue to see the university as an educational institution, not simply as a vocational training establishment.

Although degrees in foreign languages and literature are not vocational qualifications, and although, as I have tried to show, our aims are wider than the simple provision of a skill, the question of what our graduates do when they leave university is legitimate and important. Some years ago it was commonly assumed that the only career open to such graduates was teaching. There may well have been some justification for this view, but in the last six years the pattern of employment for foreign language graduates appears to be changing. Whereas in 1978 52.5% of all Arts graduates in New Zealand and 39.7% of all Australian Humanities graduates were either employed as teachers or training to become teachers, the figures had dropped by 1983 to 29.2% for New Zealand and 30.2% for Australia. In the same period there has been an increase in the proportion of Arts/Humanities graduates who find employment in private industry. Groups such as management and secretarial, sales, marketing, purchasing and finance, taken together, show an increase, in New Zealand from 9% to 14.6%, in Australia from 24.9% to 33.2% of the total number of graduates. The figures appear to indicate that this is a trend, which is encouraging, because it suggests that an increasing proportion of Arts graduates will enter the wider community. We are therefore not in danger of becoming an ever decreasing exclusive band of scholars whose only function seems to be self-perpetuation.

A second important question is whether in our increasingly technological society graduates in foreign languages and literature can realistically expect employment in competition with graduates in Science and Technology. The prevalent myth appears to be that Arts graduates, and in our case foreign language graduates, find it more difficult to obtain positions in today's labour market than, for example, Science graduates. The figures we have show clearly that this is not the case. In the most recent Australian statistics, for example, (9) foreign language graduates, together with graduates in Area Studies, are listed separately from general Humanities students. At 30 April 1983, 34.1% of this group is reported to be seeking full-time work. This is a lower percentage than, for example, for graduates in Biological Sciences (39.4%), Microbiology (42.5%) and Biomedical Sciences (35%). Graduates in Psychology (33.7% of whom were still looking for full-time work), Sociology (33.1%), Biochemistry (34.0%), Chemistry (33.3%), Physics (30.2%), Architecture (33.0%) and Agricultural Sciences/Forestry (32.5%) appear to have only marginally better chances of obtaining full-time employment. The figures for New Zealand are not as detailed.(10) Foreign language graduates are not listed in a separate group, but are included in the Humanities section. Nevertheless, the picture appears to be similar to that in Australia. 13.5% of Humanities graduates were still looking for employment in 1983, exactly the same percentage as Science graduates, and a lower percentage than graduates in Architecture (16.4%), Journalism (27.3%), Dentistry (14.0%), Home Science (14.5%), Law (14.3%) and Veterinary Science (19.3%).

Thus the figures clearly indicate that foreign language and literature graduates, produced by Australian and New Zealand universities, are employable. Their chances of employment, although not as good as those for graduates in Computer Science, Economics or Medicine, are no worse than those of most general graduates. This fact does not appear to be known and appreciated by the community at large.

I hope to have shown that foreign languages have a legitimate and important place in the modern Humanities curriculum, that the teaching of literature is of educational and social value and should not be abandoned, and that graduates in foreign languages and literature are employable. Teachers of foreign languages and the institutions in which they work are nevertheless faced with the problem of decreasing rolls. This has already led to the closing of some foreign language departments in universities overseas and to the abolition of chairs in subjects such as French, German and Japanese in New Zealand. In a climate of economic stringency and narrow vocational attitudes to education, language teachers, no matter how highly their contribution to education may be valued, are an endangered species.

A number of remedies to halt the decline in enrolments have been suggested. They include abandoning the teaching of literature and heavy emphasis on linguistics, the introduction of courses which deal with foreign literature in translation, the lowering of standards (usually expressed euphemistically!), the introduction of 'area studies' without the requirement to take any language of the area under consideration. All these remedies undermine, to a greater or lesser degree, the principles which I have outlined above. The new course combinations at Waikato University, which I will describe below, are based on the premise that it is possible to retain an essential core of high quality language and literature courses for those who want them in the context of an Arts degree, while at the same time increasing enrolments by catering for students who have a clear vocational orientation.

Until recently, students who entered University with the aim of preparing themselves for a career in private industry by studying foreign languages as well as obtaining professional training had a choice between two basic patterns of study. They could either read for a BA degree in foreign languages together with possibly some Economics or Accountancy, then enter the labour force and receive training 'on the job'. Alternatively, they could do a degree in Commerce or Management. This usually precluded taking a foreign language because of the much more tightly prescribed course patterns in such degrees. These students would therefore have to do their language training 'end on', after their professional training. This is a system which is practised by some Business schools in the United States.(11) Both these patterns have serious deficiencies. The BA degree with subsequent training in Management means that graduates enter the career structure at a comparatively low level, in comparison with graduates in other disciplines. They may admittedly expect more rapid promotion than non-graduates for example. This expectation however does not appear to make the BA degree more attractive to prospective students as a means of entry into private industry. The problem with the Management or Commerce degree with language training to follow is that it delays the entry of the graduate into the workforce. In addition, if any degree of competence is to be achieved, the course will have to be intensive, a total of 700 to 1000 hours instruction, as we have seen. There are very few such courses in Australia and New Zealand at present.

The answer appears to be a combination of vocational training and language study; this is what we are attempting to do at Waikato University. Our Bachelor of Management Studies (BMS) is a four year degree, comprising of 28 units, called courses. Of these, 15 are compulsory, namely 3 in Co-ordinating Studies/ Business Policy, 2 in Management Systems, 2 in Economics, 2 in Mathematics and Statistics, and one each in Computer Science, Accounting, Administration, Law, Finance, plus a Report on an Investigation, a kind of mini thesis which is normally presented in the fourth year of studies. From the remaining, non-compulsory courses, the student chooses a specialisation, such as Accounting, Marketing, or Personnel Management. It is within these options that foreign languages are taught to a number of Management students in the context of what we call the International Management Programme. This programme provides for one course per year over the four years in a nominated foreign language, at present French, German or Japanese. These courses, with 78 contact hours per year for students who have studied the language at school, are basically the same courses, with the same requirements, as those taught to our Humanities students. No concession is made to 'business language' on the grounds that, with good basic competence, specialist vocabulary and usage can be acquired very rapidly.

In addition to the language studies, a background course is taken in the second year. It treats the main social, political and economic forces that have shaped the business environment in the countries whose language the student is learning. A second background course, which is taken in the third year, focuses on selected aspects of the current management styles, financial issues, accounting practices, commercial law, marketing processes and industrial structure in the countries concerned. For selected students there are possibilities for carrying out the field work for their Report with some scholarship assistance on an Investigation in the country whose language they have studied.

The degree pattern which I have just outlined is designed for Management students who wish to specialize in Marketing or related areas for example. For students who would like to work more intensively in the areas of language and literature, but who nevertheless wish to have some Management content in their degree, the BMS pattern is too rigid. It does not permit the study of two languages. For these students, we offer an MA which has a core of Management courses including a specialisation. In addition to this core, the student also takes 8 courses in one foreign language and 5 in a second, plus three courses at Master's level in the majoring language.

It is too early to draw firm conclusions as to the success of these programmes, since they were instituted only in 1979 with very small numbers of students. Some tentative comments can, however, be made:

1) One of the greatest difficulties for the foreign language side of the programme has been to convince our colleagues in Management that adequate provision must be made for foreign language learning; this means, above all, time for instruction. One course per year is not really enough to produce graduates who have the kind of competence in the foreign language that we would ideally like to achieve.

2) The programme is attracting an increasing number of good quality students. Whereas in 1982, the total number of students taking the options was 19, this number had risen to 48 by 1983 and to 61 in this year.

3) The retention rate from one year of study to the next has been poor so far. Of the 19 first year students in 1982, only 10 continued into the second year and of the 1983 intake only 35% enrolled in the programme this year. Most of the others either transferred to an Arts degree or to a Management course without the language programme. There is no doubt that the programme is rigorous, and some 'weeding out' may well be desirable. Nevertheless, the retention factor will need careful watching over the next few years.

4) Staff development is crucial to the academic success of the programme. Already some staff from the School of Management have spent their study leave in countries whose languages are offered in the programme, and several of them are taking courses in a foreign language. Language staff who participate in the background courses have had to acquaint themselves with areas which lie far from their normal teaching and research fields. A certain amount of resistance to change has had to be overcome on both sides of the programme.

5) The overseas experience for selected students has been subject to some initial teething troubles. We have not yet fully established overseas support and supervisory structures which ensure that the student reaps the full educational benefit from his time abroad. This is difficult, in view of the small number of students and in view of the distance at which arrangements have to be made. But the problem is not insurmountable.

This paper embodies the result of some years of thinking, discussing, agonizing and arguing. I have tried to show that in the short time in which we have had foreign language departments in this part of the current world, we have produced a type of wine that is worth keeping and enjoying. In spite of voices to the contrary, it should not be thrown out simply because not many people appear to have developed a taste for it, neither should it be watered down for the sake of making it more appealing to a larger number of consumers. It is not a luxury, because those graduates who have tasted it have become useful and productive members of our society in proportions comparable to graduates in other areas. What we have tried at the University of Waikato is, to use a term from the world of commerce, to repackage a quality product without altering the product itself in the hope that the resulting new mix will provide an attractive package to the prospective student as well as to his future employer. Time will tell whether we have been successful in this enterprise. In the meantime we are continuing to monitor our progress, to re-examine our courses, their relationship to each other, and the administration of the programme. But I am nevertheless convinced that the concept is both viable as well as of academic and social value. I look forward with pleasure to many more vintage years in the future.

NOTES AND REFERENCES

(1) See for example Janet King Swaffar, 'Foreign Languages in the University: The Case for a Content Orientation for the Discipline', Monatshefte, 73, 3 (1981), 271-288; Gerry Cohen and Barrie Joy, 'The German Disconnection', Babel, 16/1 (1980), 3-17.

(2) Ronald W. Roskens, 'Legacies of the Tower of Babel', The Modern Language Journal, 64.2 (1980), 173-178; Edward L. McGlone, 'If I were a Foreign Language Teacher', The Modern Language Journal, 67.2 (1983), 116-120.

(3) They have a point. J. T. Roberts writes: 'Less than 200 years ago, barely fifteen million people spoke English natively. Today the number is 312 million, or about 12.5 percent of the earth's population. It is the official language of one fifth of the earth's land surface, its native speakers outnumbered numerically only by the Chinese... Over half of the world's scientific and technical journals, as well as newspapers, are written in it, as are three quarters of the world's mail.... Whichever way one looks at it, English is the world's most successful language,' ('Foreign Languages in Anglosaxony: An Attempt at a Culturo-Psychological Perspective', The Modern Language Journal, 63.8 (1979), 413). Ronald W. Roskens (note 2), p. 174, adds that three-fifths of the world's radio stations broadcast in English.

(4) The Australian situation appears to parallel my own experience. Cohen and Joy (note 1, p.1) report that in a questionaire administered to first year students in the University of Queensland, students were asked to rank four major reasons for taking German language out of a field of 14. Of the 71 respondents only ten ranked 'to read German literature' at all, and only one of these ranked it first.

(5) J. T. Roberts (note 3), 414.

(6) Cf. J. B. Carroll, The Teaching of French as a Foreign Language in Eight Countries. Stockholm, 1975, p. 275: 'For the average student in an academic-type program, it may be estimated that something like six or seven years of instruction at the usual pace (e.g. three to five class hours per week during the school year) is required under the conditions of instruction that typically obtain in many of the countries represented in the study.'

(7) This is nothing new. Eric Hawkins, Modern Languages in the Curriculum. Cambridge, 1981, p. 97, quotes the following advertisement from the 'Daily Advertiser' of 29 June, 1752: 'A Frenchman, a man of learning, is arrived in London from Paris in order to teach the French language, Fables, Poetry, Heraldry, French philosophy and the Latin tongue without exacting any study from his scholars, all study being an obstacle to his method...a simple method and one shorter than any which hath been hitherto practised...enquire at Mr. Bezancon's Snuff Shop in Little Earl Street, the Black Boy by the Seven Dials.'

(8) See note 1, p. 1. Here p.7.

(9) 1982 Australian Graduates. Activities as at 30 April 1983. Graduate Careers Council of Australia, Parkville, Victoria, 1983.

(10) The New Zealand Vice-Chancellors' Committee. Graduate Employment in New Zealand. Report No. 10, 1983.

(11) See Elizabeth G. Joiner and Robert J. Kuehne, 'The MBS Program at South Carolina: An Option for Potential International Business Executives', The Modern Language Journal, 65.3 (1981), 262-268.

IMPLEMENTING RESOURCE-BASED EDUCATION FOR CHEMICAL ENGINEERS

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INTRODUCTION

A number of factors are contributing to a decline in the quality of graduating chemical engineers. Many factors are outside the control of the university. In an attempt to counter the decline in standards, the Department of Chemical Engineering in Queensland is embarking upon an ambitious project to improve the effectiveness of instruction.

The goal of the project is more effective learning by the student for the same teaching effort, after the initial implementation phase.

This paper will outline the project which involves a revision of the curriculum, the introduction of many new instructional resources and a gradual revision of the way subjects are taught. It will also outline the techniques, adapted from instructional technology, which will be used to revise the curriculum and assist in subject design.

THE PROBLEMS

The problems that have arisen with the current instructional system are detailed in Newell, et al. (1984) and will be simply summarized here for completeness.

(a) Course content has increased in response to the developing breadth and depth of engineering science to the point where fundamentals are being submerged.

(b) The graduate in industry increasingly uses the computer to obtain information and perform calculations which is shifting the emphasis from doing to using calculations.

(c) University laboratory equipment is becoming obsolete with funding restraints and at an increasing rate which leads to the learning of obsolete skills.

(d) The increasing student-to-staff ratio is reducing feedback to students as assignments are dropped or less rigorously assessed.

(e) Students of this "electronic age" are less willing and able to use books effectively.

(f) The changing social and secondary school environments no longer seem to produce students who are "automatically" motivated.

A SOLUTION

After much discussion within the Department, it was decided that a major review was required of both the curriculum and the mode of instruction.

The current mode of instruction is dominated by the traditional lecture, supplemented by problem classes (called tutorials in engineering) and by laboratory experiments performed by groups of students. Project work is used in design subjects and there are occasional industrial visits.

It was decided to evolve towards a mode of instruction with fewer lectures (perhaps a third or half) which were used to emphasize fundamental concepts. These would be supplemented by an increased range of resources which would supply the essential instruction in background facts, concepts and applications. Staff contact time released by fewer lectures will be used to increase the tutorial-type contact time where more personal contact is possible.

This form of "resource-based education" is defined by Clarke (1982) as the use of human, material and environmental resources especially designed or selected to meet expressed aims or objectives. This definition implies three major stages to the design of instruction:

(a) The definition of expressed aims or objectives.
(b) The selection of appropriate resources.
(c) The design of the selected resource.

The remainder of this paper will outline the approaches that will be used in the first two stages. The third stage is resource dependent and will not be covered here.

CURRICULUM DEVELOPMENT

Systematic techniques for curriculum development are well established with books such as Rowntree (1974) covering the field in some detail. The steps involved have been well defined by Merritt and Harris (1972):

(a) Set a GOAL consisting of AIMS to be attained by the learner and OBJECTIVES to enable the aims to be achieved.

(b) PLAN by developing STRATEGIES for achieving the objectives and TACTICS for implementing the strategies.

(c) Develop IMPLEMENTATION SKILLS consisting of METHODS defining what to do and TECHNIQUES defining how.

(d) DEVELOP the curriculum by EVALUATION of both processes and products and CONSOLIDATION or correction.

The approach that is being taken to the first two steps will be discussed.

Course Aims

In redesigning a course, as opposed to starting from nothing, there are certain pragmatic constraints. In the present case, the Department controls only the second to fourth years of the course. This period has been divided into three:

(a) Background science subjects whose content is generally determined by many votes.

(b) Core chemical engineering subjects which define the basic graduate requirements.

(c) Elective subjects which will be used to enable the student to gain some breadth and also some depth in a particular specialist area.

The elective specialist areas are mainly determined by the expertise of the staff. The other elective subjects are a "smorgasbord" of subjects offered within and outside the Department. The current review is of the core chemical engineering curriculum.

The development of aims for the core course is following the traditional systems approach by starting with a small number of general aims for the graduate:

(a) GIVEN the task of making a product from given raw materials with the maximum economic return, THE GRADUATE should be able to synthesize a suitable integrated set of unit operations.

(b) GIVEN the task of designing or analysing a unit operation or process, THE GRADUATE should be able to formulate a model in terms of the basic mechanisms involved (fluid mechanics, thermodynamics, heat transfer, mass transfer, reaction kinetics) and to solve the resulting equations to determine conditions for optimum performance or performance for given conditions.

(c) GIVEN a process plant and a set of environmental constraints, THE GRADUATE should be able to determine the optimum conditions for operating the process and to design a measurement and control system and/or operating strategies to maintain the process at the optimum conditions despite disturbances.

(d) GIVEN a task to perform and sufficient resources, THE GRADUATE should be able to plan and organize the resources to complete the task in minimum time.

(e) GIVEN a message to communicate, THE GRADUATE should have the written and oral skills to effectively communicate with those above, at or below his/her level of responsibility and/or expertise.

These global aims have been hierarchically decomposed into about 80 more specific aims.

The next stage was to assign some weighting or importance to each aim. The professional engineering institutions have certain requirements in this regard. Therefore the aims were grouped according to their guidelines which defined some group weightings. Individual aims were then weighted within these groups by staff consensus.

The aims were then reordered into six groups (two semesters each for three years) taking into account the fact that many are prerequisite for others, the available contact hours (which varies somewhat by semester), and the natural grouping by content. This defined subjects each with 2 to 5 aims and a weighting which could be converted into a credit point figure.

Subject Objectives

There is a large literature on objectives and on their preparation typified by texts such as Rowntree (1974) and Briggs (1970). They are generally prepared by hierarchical decomposition and then ordered and represented as flowcharts, network diagrams, logic diagrams, etc. The ordering is usually on the basis of forward chaining (the simple before the complex) although individual teachers may prefer backward chaining or variants in some circumstances.

In the present project, academic staff will be given half-years off their normal duties to prepare objectives and then instructional material for subjects in their area of expertise or knowledge. Eventually each of the core chemical engineering subjects will be defined by a set of objectives relating back to the course aims.

It is hoped that such detailed subject specifications will avoid the overlap and gap problems which usually develop in courses over the years. It is also more likely to succeed in core subjects where knowledge is not at the forefront of research and is reasonably static.

Teaching Strategies

The core section of the course will be resource-based and will combine the strategies of guided discovery and of conversational learning as defined by Pask and Lewis (1972).

Both these strategies consider the student to be a problem solver and consider knowledge to be an elaborate structure or network of concepts (rather than simply a set of target behaviours). The extent of the structure or network will be defined by the subject objectives.

The guided-discovery strategy has the teacher defining the knowledge structure and dividing it to set the students a series of sub-goals which they explore using resources and problems supplied by the teacher. For example, the teacher may define a sub-goal by a lecture and supply a study guide, laboratory experiment, and problem sheets as resources and then assess progress individually in tutorials and by a test. Using this strategy, a typical subject might be divided into six two-week modules each started with a lecture followed by two tutorials and a test.

The conversational-learning strategy has the teacher defining the knowledge structure, but allowing the student much more freedom. The student decides upon the order in which material is covered and is free to use supplied resources and to find others. The teacher acts as a resource and an adviser while retaining some assessing and monitoring roles. This strategy is generally used for design projects, and can be used to extend the more gifted students.

A problem that naturally arises from a resource-based approach is the selection of the most appropriate resource for particular material.

RESOURCE SELECTION

Research into teaching shows that "the effective teacher becomes in substantial degree a humane facilitator of student interaction with instructional material" (Gage 1978). However research has not yet decided how the teacher should select which instructional material is most effective. Many would argue that knowledge should be presented in many ways leaving the student to select that most compatible with his personal approach to learning (Lesser 1972).
Few would disagree but limited time and money dictate that a choice be made, at least to determine development priorities.

Heidt (1978) presents an examination of classifications of instructional media and an attempt at defining a general theory. The principal source of agreement among researchers is that there are three factors which must be considered in the selection:

(a) the content or material to be learnt,
(b) the process or type of learning to be facilitated, and
(c) the student or the cognitive style of the recipient.

In some cases these factors have been related directly to the media or resource itself, while in others an intermediate set of media attributes have been introduced. The selection factors and media attributes will be discussed below.

There are also the pragmatic non-educational factors which must be considered such as cost, reliability, maintenance support, space and also production facilities.

The Content Factor

Heidt (1978) adapted earlier models of human intelligence to present a two-dimensional set of content attributes. One was labelled "content" with the attributes figural, symbolic, semantic, and behavioural and the other was labelled "product" with the attributes units, classes, relations, systems, transformations, and implications.

Rockart and Morton (1975) simply categorized content by four attributes: facts, skills, established concepts, and frontier concepts.

Romiszowski (1968) developed a set of flowsheets which basically considered two dimensions. The first was a division into four classes: motor responses or perception skills, verbal responses (naming, identifying, discriminating, classifying), complex verbal responses (induction, problem solving, deduction), and emotional or changes in attitude, opinion or motivation. The second dimension was based upon whether the material was visual, audible or written in nature.

The Process Factor

The adapted model of Heidt (1978) characterized the type of mental process or "operation" using the attributes: evaluation, convergent production, divergent production, memory, and cognition.

Rockart and Morton (1975) categorized the type of learning by the attributes: acquisition, embedding, integration and generalization, and testing in new situations.

Romiszowski (1968) presents a set of attributes developed by Gagné for resource comparison: presenting the stimulus, directing attention, providing a performance mode, furnishing external prompts, guiding thinking, inducing transfer, assessing attainments, and providing feedback.

The Student Factor

This factor is much discussed but usually placed in the "too hard basket" when it comes to any sort of categorization. Harris (1979) discusses the student learning approaches under sequential vs. holist, repetitive vs. creative, converger vs. diverger, external vs. own learning, and haptic vs. visual. Heidt (1978) also discusses the student under such headings as personality traits such as introversion vs. extroversion and environmental factors such as stress and anxiety.

However none of the attempts at media selection have included any aspects of the student factor.

Media Attributes

Rockart and Morton (1975) presented an excellent selection of attributes with the emphasis on the educational as opposed to the attributes listed by Briggs (1970) or Gane (1972) or Weiss and Klepzig (1981) which were predominantly on the pragmatic issues of cost, maintenance, reliability, etc. The sixteen attributes of Rockart and Morton (1975) are listed below in four categories:

(a) content related: ability to telescope time, ability to present structure, provision of a rich environment, ability to provide ill-structured material, flexibility for adding new material quickly, support for the learners' structured clerical tasks, support for unstructured data manipulation.

(b) user related: degree of learner control, ability to adjust to individual learner needs, ease of use.

(c) communications related: amount of sensory impact, amount of emotional impact, degree of learner feedback, ability to access facts or concepts previously learned.

(d) economics: low cost per data item or concept, decentralized availability.

Selection Guidelines

A set of comprehensive selection guidelines is introducted by Rockart and Morton (1975). This is a ranking system in which firstly the media attributes listed above are ranked in a matrix of content factor by process factor. Then a variety of resources were ranked by media attributes. By combining the two rankings selections can be made. The resources considered were lecture, case study, class discussion, audio tape, radio, visual aids, film, videotape, cable TV, textbooks, programmed instruction, study modules, written assignments, tutorial computer-aided learning, drill-and-practice, problem solving, inquiry data bases, computer simulations, computer games, laboratory experiments and real-world experience.

Romiszowski (1968) presented some flowcharts for making selections based largely on the content factors mentioned above.

Briggs (1970) presented a matrix of resources against various factors, largely content and pragmatic in nature, with yes/no entries in each square. Romiszowski (1968) presented a similar matrix from Gagné against process attributes and Gane (1972) presented one against purely pragmatic attributes. None of these actually made a selection for you, but purely presented information to assist your own decisions.

Computer-Assisted Selection

The variety of selection information available is almost impossible to collate manually in any "user-friendly" fashion. Multi-criteria decision techniques like that presented by Weiss and Klepzig (1981) are one possible approach. However it was decided to attempt to enlist the help of an "expert system".

Expert systems can perhaps be crudely described as computer simulations of experts. Kinnucan (1984) presents an excellent introduction and summary of the types of expert systems and their current applications. They consist basically of three elements: a user interface which asks questions and gives advice, an "inference engine" which makes decisions, and a "knowledge base". The program collects information from the user and its own "knowledge base" and makes the best decisions it can.

A prototype program was based upon the rankings of Rockart and Morton (1975) and a "rule-based" type of expert system written in the C language under MS-DOS on an NCR Decision Mate personal computer. The results were promising, giving very similar advice to that Rockart and Morton (1975) obtained manually from their rankings. The four most highly recommended resources for each situation is shown in the following table.

Process Factor	Content Factor			
	Facts	Skills	Established Concepts	Frontier Concepts
Acquire	textbook study module prog. instr. lecture	textbook study module prog. instr. lecture	lecture textbook simulation games	lecture simulation games videotape
Embed	simulation prob. solv. drill & pract. games	simulation prob. solv. drill & pract. games	simulation games prob. solv. drill & pract.	simulation prob. solv. games data base
Integrate	simulation prob. solv. data base games	simulation prob. solv. games drill & pract.	simulation games prob. solv. data base	simulation games prob. solv. data base
Test	data base prob. solv. textbook drill & pract.	simulation data base prob. solv. games	simulation games prob. solv. drill & pract.	simulation prob. solv. games drill & pract.

The second version of an expert system for resource selection is currently being implemented using an "object-oriented" (Steels 1983) or "frame-type" (Kinnucan 1984) approach. This will more readily allow the flowsheets of Romiszowski (1968) to be combined with the rankings of Rockart and Morton (1975) to improve the scope of the selection factors.

SUMMARY AND CONCLUSIONS

The paper has summarized the reasons that the Department of Chemical Engineering at the University of Queensland is embarking upon an initiative to introduce resource-based education for its core curriculum.

It has described the systematic curriculum design procedures of setting course aims and subject objectives that are being used. It presents the teaching strategies, guided discovery and conversational learning, upon which the redesigned subjects will be based.

The paper then summarizes the somewhat sparse literature and disconnected ideas on the selection of resources and the factors upon which selections should be based. It was concluded that the only practical way to combine the available selection information was to construct a simple "expert system". A prototype has performed well, and a more sophisticated system is being implemented.

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A COMPUTER-BASED TEACHING SYSTEM

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INTRODUCTION

Until recently, the conventional way to teach undergraduate students at most universities and colleges of advanced education was through dissemination of reading materials or classroom sessions, use of laboratory equipment and assignments. Whilst these methods have worked satisfactorily in the past, recent increases in the number of subjects offered as well as a reduction in teaching/student ratio in most universities in Australia has led to a situation where a single lecturer is responsible for training a great number of students. Retaining little or no contact with individual students, the lecturer is unable to take various levels of intelligence and speeds of learning into account. Further, universities and colleges of advanced education are faced with the changing needs of expanding student groups which include adult education, continuing education studies, vocational and skill training. More and more educators and school administrators are becoming interested in educational achievements which can be obtained by using computer-based programmed instruction.

This paper reviews the current state-of-art of Computer-Based Teaching Systems and suggests how they might be applied to tertiary education in Australia. This paper will also describe the author's work in developing a general purpose computer-graphic-based teaching system at the University of New South Wales and, in particular, its incorporation into the teaching of final year elective subjects in 1982 and 1983.

REASONS FOR USING A COMPUTER-BASED TEACHING SYSTEM (CBTS)

Whilst many authors (Tawney (1979), Hicks & Hunka (1972) etc.) have suggested a Computer-Based Teaching System to be the panacea for education, there are equal numbers of critics of the technology in Australia and overseas who firmly believe that CBTS has nothing to offer. Listed below are some of the advantages and disadvantages often given [Bitser & Johnson (1971), Rockart & Morton (1975), Thorson (1979)] to support these views:

Advantages:

(a) Teaching does not depend on the availability of expert instructors, but can be available whenever it is needed.
(b) The graphical simulation capability of the CBTS system allows students to ask 'what if' types of questions and hence develops greater physical understanding of the problem.
(c) Training is accomplished on a one-to-one interaction with the computer.
(d) It is structured to provide freedom to ask questions without embarrassment.
(e) The students can proceed at their own pace.
(f) It presents the problem in a logical sequence.
(g) It can give the student hands-on experience.

(h) Training can be individualised so that students can be allocated courses that are relevant to their specific needs.
(i) Course material can be updated conveniently if the source code is available.
(j) It enhances rather than substitutes for the lectures.
(k) It can stimulate a student's interest to extend his knowledge either by continuing with more complex course-work or reading relevant material.
(l) Student performance can be recorded to allow assessment or to decide what activities should be prescribed for the student. Proficiency can be assured by providing practice and remedial help until the desired level of mastery is reached.
(m) Student's records & criticisms can provide information for improving future changes to the course material.

Disadvantages

(a) It requires a lot of effort in programming, especially the graphic part of the courseware. Unless it is used frequently and by substantial numbers of students, it might not provide an adequate return on investment.
(b) Initial capital investment is usually quite high, although program exchange schemes and/or joint development of CBTS material can reduce the total cost considerably.
(c) Some Computer-Based Education Systems are not transportable between systems due to their dependence on particular computing equipment.
(d) Software is usually tailored for the developer's own use. Generalisation is rarely a preconceived strategy.

COURSEWARE

Whilst any of the disadvantages mentioned above might be considered as valid, recent work in Europe, the United States and Australia has produced software, tools and program exchange facilities which allow considerable reduction in the total cost of installing a CBTS program. Of typical importance are the following:

(i) The National Development Programme for Computer Assisted learning (NDPCAL), supported by the British Government spent more than £ 2.5 million between 1973 and 1980 sponsoring some 35 studies and projects. Nine of these projects were concerned with engineering, mathematics or the sciences at tertiary level. The nine projects between them produced around 250 packages which can be made available through the program exchange facilities, e.g. Engineering Science Program Exchange (ESPE) based at Queen Mary College in London has established an exchange service for CAL material in engineering science to maintain and extend communications between groups of engineers working in this field. Further information about these services and types of programs available are given by Tawney (1979).
(ii) PLATO - The Computer-Based Education System originally started at the University of Illinois, USA, is now available commercially through Control Data Corporation. More than 5000 hours of computer-based educational material, in diverse fields from art to engineering, have been prepared on the PLATO System. A powerful authoring tool is available that allows educators to write lessons with ease.
(iii) Within Australia there are a number of centres that have developed

computerised teaching programs. A new bulletin distributed by the Educational Research and Development Unit of Queensland Institute of Technology called PCAL (Personal Computer Applied Learning) Report, now contains a register of microcomputer courseware/software available in Australia.

A GENERAL-PURPOSE COMPUTER-BASED TEACHING SYSTEM DEVELOPED AT UNSW

Whilst some courseware can now be obtained commercially or through the exchange program facilities, they are usually written for the developers only and appear unintelligible to another user. Further, curriculum is usually different from University to University, hence changes to courseware are usually required. To avoid this problem, a general purpose Computer-Based Teaching System has recently been developed by the author at the University of New South Wales with the following attributes:

(1) Extensive use of graphics
(2) Ease of textual/graphics entry and modification
(3) An efficient and extensive indexing system
(4) Structure independent of and useful in any education discipline
(5) Pleasant, interactive procedure
(6) Easily interfaced with currently available simulation programs.

The CBTS system consists of three blocks of porgrams:

(A) A general purpose authoring program incorporating graphics
(B) A compiler for (A)
(C) Computer-Aided-Instruction system,

and allows for such diverse applications as:

(a) Exercises and lessons
(b) Tutorials - to learn concepts based upon the results of (a)
(c) Simulations - to apply the concept to a simulated real life situation.

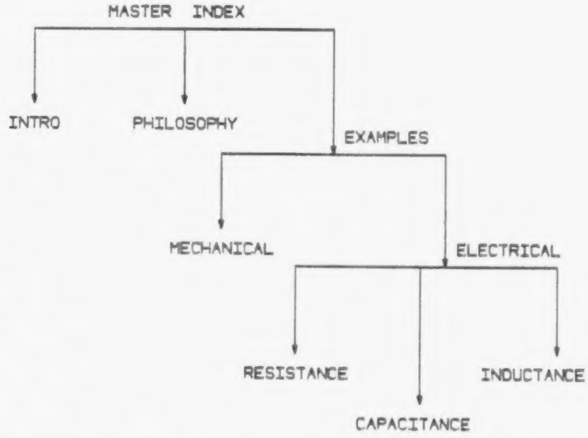

Figure 1: Index Structure

These three blocks of programs are linked together by a five level tree type indexing system, a typical structural example being shown in Figure 1. Each sub-index may contain nine entries, with each entry either terminating the branch with a lesson or pointing to another sub-index on the next level down. Up to nine lines of descriptive text may be associated with each sub-index entry.

The general purpose authoring system is an interactive program allowing the lecturer to enter text and graphics (using easily learned high level programming commands) in the same order as his students would see them.

Up to four types of statements are recognised:

(1) Precursor
(2) Question
(3) Answer
(4) Explanation

Each of the four statement types have definable scrolling regions and the information associated with each may be either text, graphics or a combination of both. Graphics can be generated by manipulating cross-hair cursors, light pen or digitising tablet and typing a few simple mnemonics (such as 'm' for move, 'j' for join, or 'r' for resistor).

The terminal being used is a raster scan device; thus, it is possible to erase portions of or add to the graphical display either for answer or explanation purposes. The lecturer can define that an external program (e.g. complex electric power simulation package) must be executed at a particular point in the CBTS thus allowing the students to apply the concept they have learned to simulated real life situations.

Once the data entry has been completed the lecturer compiles the lesson. The CBTS compiler interprets all statement functions, graphical and text, and sets pointers to all data files. It reports any mistakes that might be entered by the lecturer and also sets up record files for students activities within the CBTS.

In Instructional mode the CBTS displays the master index and prompts to enquire which sub-index the student would like to study. The lesson will then be displayed on the screen in the order the lecturer has set up during data entry.

The CBTS system is currently being used by fourth year undergraduate students at UNSW. Students' responses have been encouraging and the following enhancements are currently being envisaged:

(1) Use of colour graphic terminals to highlight important information.
(2) Extension of the allowable key commands to include all standard electrical and electronics symbols

CONCLUSION

The ease with which a lesson system utilizing graphics and text can be developed and modified allows the lecturer to use the CBTS as a supplement to traditional lectures. In this way, the CBTS enhances the lectures rather than substitutes for them. Recent experience with the CBTS has demonstrated that by wise choice of available programs and proper incorporation of them into the CBTS, an effective system of teaching can evolve.

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ASSESSMENT OF STUDENTS IN LIBERAL STUDIES (LIFE SKILLS) SUBJECTS

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Introduction

In this paper I wish to report on a current study being conducted in TAFE Curriculum Branch in Queensland to identify the problems associated with assessment of students in Life Skills subjects and to suggest strategies to overcome these problems. The study is not complete and at this stage only an interim report has been prepared.

The Nature of the Problem

The rationale for inclusion of Life Skills subjects in a range of courses in Technical and Further Education (TAFE) in Queensland is set out as Part A of the curriculum document for the subjects (1983). Life skills are seen as those skills "necessary for survival in the workplace for some, and an enhancement of the quality of life for all". They are meant to help people adapt to change because the "need for people to be adaptable and flexible can no longer be ignored." (p.1) (The value of including subjects of this kind into vocational courses has been given strong support during this conference by Mr J. Clark, General Manager, Port Kembla Steel Works, who made a strong point in his address that problems can arise in an organisation at all levels through poor communications and inadequate human relationships, even when employers are very competent in terms of technical skills.)

Life Skills subjects are Communication Skills, Social Skills, and Human Movement. They are updated versions of Work Related Liberal Studies subjects which were introduced into one TAFE course in 1977 and to others since then. This makes the subjects relatively new. Many of the teachers who teach them are new to TAFE and have professional backgrounds different from those of other TAFE teachers. The inclusion of the subjects into TAFE courses has not met with universal acceptance. Where they are included, there are pressures to have students assessed in these subjects in ways similar to those used in more traditional (technical) subjects. One other difficulty that has to be considered is that there is a requirement by the TAFE Authority for a formal reporting of results, on an Honours, Credit, Pass, Fail basis, as for the vast majority of all subjects in all courses offered in TAFE in Queensland. The task for teachers to reconcile seemingly conflicting demands can be a difficult one, particularly since the formal reporting is generally seen as a norm-referenced procedure, that is, one in which the numbers of Honours, Credits, and Passes are expected to conform approximately to suggestions made as guidelines by headquarters. The reporting of the assessment results has also a formal and summative component in that at least an overall pass in Life Skills is necessary as part of the requirements for an award.

In 1981-82, an evaluation was conducted on what were then called Work Related Liberal Studies subjects. All colleges in the State where these subjects were conducted were involved. (Khan, 1982). One of the findings of the study was that

> every respondent (teacher) believes assessment in some form is necessary to provide feedback to students and it also provides teachers with a means to motivate their students. (p.86)

There is, according to the report, an attitude among students also that if these subjects are not assessed, they cannot be important. The report also mentioned a number of ways assessment was being conducted but pointed to the need for further research in the area.

In late 1982, a decision was made to re-write the syllabus documents for these Work-Related Liberal Studies subjects, to change the name to Life Skills subjects and to incorporate them into full-time pre-apprenticeship, pre-vocational, and pre-employment courses in such a way that at least 25 per cent of the time for these courses was devoted to Life Skills subjects. Students were still to be assessed, and an overall pass was required. Assessment was to be as for the earlier Liberal Studies subjects until it was seen necessary and appropriate to change this.

The essential questions remained:

What are the best ways to assess these subjects validly and reliably and how can assessment results in three different areas be sensibly combined to produce a single final assessment?

The Life Skills Subjects

A brief description of the three subjects included in Life Skills is necessary here. The subject, Communication Skills, concentrates on skills which enable meaning to be transferred between people, such transfer always involving two or more people. It is concerned with strategies to overcome barriers to effective communication and includes teaching sensitivity to the presence of these barriers and to help people to act and behave appropriately in order to help them become more effective communicators.

Social Skills is a subject which has a heavy emphasis on improving the self-concept of students, by helping them to be realistic about what they can do and accurate about what they have done, helping them to set realistic goals, and helping them to appreciate the needs of others and how to relate to others. The emphasis on self-esteem is considered necessary because many of the students entering these courses have not often experienced success in the past and, as a result,have developed negative attitudes to themselves and their potential.

The Human Movement program aims to make students aware of preventive health, to develop good postural habits, to avoid skeletal and ligamentous strains and to foster strength through physical fitness. It also sets out to make students aware of change as a result of technological developments and to the implications of these developments on employment opportunities and leisure pursuits.

Proposals for assessment

In an attempt to suggest ways to overcome the problems discussed above, a study is being made of the way students in similar subjects are being assessed elsewhere, and teachers of the subjects in TAFE in Queensland are being given the opportunity to present their own ideas. The limitations with the former process is that the literature in the field is limited particularly when the specific nature of the problem as it relates to courses in TAFE in Queensland is considered. Work has been done in TAFE in New South Wales (1981) in communications and references are made in syllabus documents in other States.

Teachers of the Liberal Studies subjects (the forerunners of Life Skills subjects) have been given a chance to present their ideas on how assessment in these subjects might be conducted. Teachers in five colleges were interviewed in group sessions which were recorded on audio tape. On the basis of an analysis of the transcripts of the tapes a questionnaire was developed and distributed to the teachers of these subjects in all other colleges in the State.

Two of a number of interesting findings may be reported here. One was that although there was an overall reluctance to introduce innovative strategies to assess students in these subjects, there were instances of interesting ideas being used by teachers. The second was that the range of ideas for assessing students, the purposes of assessment, and the ways to report results was well beyond what might have been expected. For example, there were twenty ways suggested for grading the students as well as the current Honours, Credit, Pass, Fail basis. No one method was clearly predominant among those suggested. In fact there are conflicting points of view. On the one hand, there were those who suggested that there should be no formal assessment, certainly not in Human Relationships, since formal assessment which was norm-based and led to competition among the students was inimical to objectives and the spirit of the subjects. On the other hand, there were those who insisted that the status of the subjects would be reduced in the eyes of students, teachers of technical subjects, and prospective employers if there were no formal assessment and no final grades awarded in these subjects. Different points of view also arose between those teaching these subjects in courses such as the Pre-vocational Engineering/Construction, where most of the students were male, and the Pre-vocational Business Studies course, where most of the students were female. Deciding on the reasons for the differences in points of view is made more difficult in that the syllabus requirements for assessment in the former type of course specify the use of grades, whereas the syllabus for the Business Studies course has this statement:

> 'The four personal development subjects (Communication Skills, Human Relationships, Career Education, and Health and Leisure) are non-assessable but suggestions for reviewing student progress are listed under each syllabus. The Award document contains an overprinted statement which reads:
>
> > *A non-assessable subject PBS000 Personal Development has also been undertaken comprising Communication Skills, Human Relationships, Career Education, and Health and Leisure.'* (p. 23)

Suggested Strategies

There have been so many questions raised, so many conflicting points of view expressed, so many dilemmas created as a result of the introduction of the Life Skills subjects, that a single approach to assessment in these subjects will not satisfy everyone with an interest in the issue. There does seem to be merit in the greater use of formative assessment and the playing down of the summative aspect of assessment in these subjects. Formative assessment will be designed and used in such a way as to become an integral part of the teaching-learning process. Instruments and techniques involved can be relatively unobtrusive while pervading learning. They will be diagnostic and enable the student to know what is correct as well as what is wrong about an activity or performance. Self assessment and group assessment techniques will be used as part of a policy to develop responsibility and a positive self-concept and to play down the competitive nature of assessment. More detailed reporting on the student will replace a single summative result. Such moves will need to be introduced carefully since the evidence is that students entering these courses expect formal norm-referenced assessment and will need to be eased into a different approach. Trials will need to be organized in samples of colleges and courses. Teachers too will need, through in-service workshops, to be assisted to handle the new approaches. The additional and different use of teachers' time will need to be considered as the greater use of assessment to aid learning will be new to many of them.

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CHAPTER 5

LEARNERS AND LEARNING

In contrast to the previous section, the papers in this section focus on students and on the processes and outcomes of learning. Two theoretical papers begin this section, both concerned with a conceptual approach to student learning in science.

Tamir's paper gives a brief overview of the relationship between learning theory, research and practice in higher education; Hegarty extends Tamir's ideas in a thorough and interesting way by focussing on the use of concept mapping in science.

Atkinson and Guiton, in describing a joint venture between staff of Malaysian and Australian universities, discuss the relevance of selected learning theories to the practical business of constructing distance learning courses and conclude that they are valuable pointers but are not panaceas. Clift looks at the university performance of three groups chosen by age and qualification at entry in order to test the proposition that mature students do better than younger students. Finally, Landbeck discusses the difficulties encountered by part time university students and describes the restructuring of a degree so that these students may be more effectively helped to learn and to persist.

WHAT DO LEARNING THEORIES AND RESEARCH HAVE TO SAY TO PRACTITIONERS IN SCIENCE EDUCATION?

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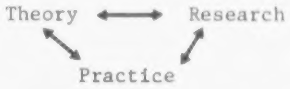
(The paper was written when the author was a Visiting Professor at Monash University).

Interesting relationships exist between theory, research and practice:



As shown in the diagram, the three depend on and interact with each other. Theory provides a basis and a lead to research and a guide for practice. Research tests the validity of theories and the effectiveness of practice, and, at the same time provides guidelines for improving practice. Practice applies the results of research and the theoretical principles and at the same time contributes problems and ideas for further research as well as for the building of theories.

In this brief article I shall limit myself to some ways of applying selected learning theories and research to the practice of higher education.

PRIOR KNOWLEDGE

Ausubel (1968) argued that if required to reduce all of educational psychology to just one principle, it should be this: that the most important single factor influencing learning is what the learner already knows. Ascertain this and teach accordingly.

Two questions may be raised in relation to the above statement:

1. How can teachers find what their students already know?

2. How do they teach "accordingly"?

There are two senses in which prior knowledge is important. According to Gagné, for any higher order concepts such as energy, heredity, equilibrium or natural selection one can identify a series or a hierarchy of prerequisite concepts and facts that one needs to learn and understand in order to comprehend the particular higher order concept. For example, in order to understand the concept of heredity one has to know the meaning of chromosome, mitosis, meiosis and gene. By the same token, in order to understand the concept of mitosis one has to know the meaning of cell and cell membrane, etc. In these examples prior knowledge is essential for subsequent learning. But there is another sense, identified by Ausubel as "familiarity" which, although it may not be essential for the learning of a particular concept, does have, nevertheless, a profound influence on subsequent learning. For example, the high school curriculum and the learning experience that students had while studying biology or history in high school, have significant and considerable effect on the study and achievement of students in these disciplines at the first year of their university studies. In order to find out what students already know about and in relation to particular concepts, one can use a number of strategies, such as class discussions, pretests, concept or skill inventories and concept maps.

Class discussions may give only general impressions, and often, especially with large classes at tertiary institutions, they may be rather difficult to run. Pretests could be very useful. However my observations reveal that they are rarely used. One reason for not using pretests may be the need to invest time in their construction, assessment and analysis of results. The time and teacher readiness to undertake the task are two significant constraints. However, to my mind the most plausible explanation is the reluctance of teachers to confront students in their first class with an experience which they usually dislike. To overcome this hurdle I offer the idea of using concept and skill inventories. Such an inventory consists of a list of concepts and/or skills. For each of these items the students indicate on a five point scale their perception of their knowledge by choosing one of the following options:

1. don't know, don't understand
2. know a bit, vaguely understand
3. not sure, partially understand
4. know and understand well
5. can explain to a friend

Experience shows that students can respond adequately to a list of about 100 items in one period. Analysis of results is easy, quick and straightforward. Even though the responses may not represent the exact situation due to inability of students to assess accurately their relevant knowledge, by and large the information is good enough to assist in making decisions about time allocation and relative emphasis to be put on different topics. The exercise is well received by students and provides them with a better idea on what their course is going to be. Like concept inventories, concept maps are also newcomers to the educational arena. Concept maps may be used to identify the students' cognitive structures as related to major concepts, their prerequisites, their derivatives as well as their associations. Whatever means the instructors choose to use, the significance of finding out what students already know and how their knowledge is organised as a first step in the instructional sequence, should not be overlooked.

INQUIRY AND CONCEPT LEARNING

I shall discuss three issues in relation to inquiry.

1. The two facets of inquiry.
2. Inquiry levels.
3. The role of inquiry in concept learning.

Schwab (1962) identified two facets of inquiry: science as inquiry and learning by inquiry. The first relates to the nature of scientific knowledge which is often presented as a set of definite and absolute propositions. Schwab argues that such a presentation leads the learner to view science as "rhetoric of conclusions" while, actually, science is a "narrative of inquiry". The second, unlike the first, presents the scientific principles, theories, laws and facts in the context and with the processes of their creation emphasizing the problems, the doubts, the conflicts, the competing ideas and the story of how this knowledge was created. According to this view, concepts studied in isolation from processes not only lead to deficiencies in understanding, but actually result in a distorted image and false understanding. Whatever instructional strategy we choose we should always make sure that the concepts are taught along and with their syntactic structure.

As we move to teaching and learning by inquiry it may be useful to realize that a great variety of learning strategies may qualify as inquiry oriented. The most important characteristic of inquiry learning is the active involvement of the student in constructing his/her knowledge either by experiential means (e.g. laboratory practical work) or by other intellectual activities such as problem solving, analysis of research papers, etc.

It is useful to classify inquiry learning by the degree of guidance provided to the learner. Table 1 shows a scheme based on that developed by Herron (1971) for assigning degrees of guidance given to students with the problem on which they will be working, the procedure and the data, interpretations and conclusions to be obtained.

Table 1: Degrees of guidance in inquiry learning

	Problem	Procedure	Data	Interpretation and Conclusion
Level 0	Given	Given	Given	Given
1	Given	Given	Given	Open
2	Given	Given	Open	Open
3	Given	Open	Open	Open
4	Open	Open	Open	Open

It is up to the teacher to strike the balance between these levels to match the objectives of the course and the abilities of the students.

Inquiry learning is the only way to acquire inquiry skills. However, inquiry learning can play a very important role in concept learning as well. The opportunities provided by inquiry learning for the students to express their ideas, to argue and discuss, to test and validate, to examine alternative explanations and to weigh evidence can provide invaluable steps in leading to meaningful learning. Confrontations with natural phenomena are, as shown by Piaget and others, a useful means for diagnosing and identifying students conceptions and understanding. Problem solving and application of prior knowledge to concrete tasks whether in the classroom, or in the laboratory, or outdoors are, as argued by Ausubel, an effective way of assessing meaningful learning.

Thus, inquiry strategies, adequately employed, have a high potential for diagnosis, learning and assessment of concepts.

Here are presented only a few examples to illustrate the implications of research and learning theories to instruction. Perhaps these examples will encourage practitioners to make use of findings of educational research and, as well, to contribute findings based on their own experiences for the benefit of higher education.

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STUDENTS' UNDERSTANDING OF SCIENCE CONCEPTS

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THEORY BACKGROUND

Probably the most significant theory background for research in this field lies in Piaget's theory of developmental psychology and his studies of young children's understanding of physical science concepts. More recent research has extended the age range of students through to secondary and tertiary levels of education but recent listings of the concepts studied (Osborne and Wittrock, 1983) show that they are still chiefly in the physical sciences (e.g. force, friction, gravity, kinematics, heat, temperature, physical change). Only a few concepts in the biological sciences have been studied (e.g. animal, living). Perhaps the most important debt to Piaget is one of method,with variations on the clinical interview technique currently being as widely used by researchers who do not see themselves as working within a Piagetian framework as by those who do.

There are different schools of cognitive psychology which have arisen more or less independently and which, to date, have not been successfully subsumed into some overarching theory. Each has special relevance to research on students' understanding of science concepts. Ausubel's theory of cognitive psychology (Ausubel, 1968; Ausubel, Novak and Hanesian, 1978) focusses on the development of knowledge and emphasizes the crucial role of prior learning. Other cognitive psychologists focus more on syntactic rather than substantive knowledge (i.e. 'knowing how' rather than 'knowing that') and include those taking an information processing approach (Newell and Simon, 1972; Norman and Rumelhart, 1975; Lindsay and Norman, 1977) as well as the contrasting phenomenological approach using notions of surface and deep learning (Marton and Saljo, 1976).

Research on students' understanding of the science concepts requires a theory background on long term storage in human memory. Gagné and White (1978) proposed a way of considering long term memory as a store of four kinds of memory structures: networks of propositions, images, episodes and intellectual skills, of which propositions are probably the most immediately relevant to research on learning of science concepts.

Connections are needed between all these different approaches. The generative learning model (Wittrock, 1974; 1978) holds promise for drawing together theories of cognitive psychology and theories of memory in an active and productive way :-

> According to the model, to learn with understanding a learner must actively construct meaning. To comprehend what we are taught verbally, or what we read, or what we find out by watching a demonstration or doing an experiment, we must invent a model or explanation for it that

> organizes the information selected from the experience in a way that makes sense to us, that fits our logic, or real world experiences, or both. People retrieve information from long-term memory and use their information processing strategies to generate meaning from the incoming information, to organize it, to code it, and to store it in long-term memory. (Osborne and Wittrock, 1983, p.493)

Thus, meaning is defined as being generated from the incoming information and is not the same as the information itself. The generative learning model is therefore arguably a more active model than Ausubel's theory of learning or Gagné and White's theory of memory.

CLARIFYING TERMINOLOGY

A variety of new terminology has been introduced recently: cognitive structures, conceptual change, alternative frameworks, conceptual development, student misconceptions. West and Pines (in press) have clarified the situation. They illustrated their clarification with a metaphor of two vines, an upwardly growing vine of a learner's intuitive knowledge gleaned from the everyday world and a downwardly growing vine of formal science knowledge (imposed from above) gained from the formal educational systems. At least three different situations exist:

- Congruent. This would perhaps be the most pleasant learning situation where the two vines are well established and able to intertwine strongly, i.e. congruent, not in conflict. Thus knowledge acquired at school, college or university reinforces a student's existing ideas, integrating them into a larger whole and extending the student's everyday understanding of the world.
- Conflict. The two vines may be well established but the formal science knowledge is in conflict with a learner's reality. Here it is said that mature learning involves transferring one's commitments from one set of ideas to another, e.g. a student holding an Aristotelian view of mechanics would be challenged to understand and change belief to a Newtonian view and then again to an Einsteinian view. Such a change could be termed conceptual change and in this area of the literature the term alternative frameworks is often employed.
- Symbolic knowledge. This is where there is hardly any upward growing vine of intuitive knowledge which is relevant to interact with the imposed learning of formal science knowledge. Acquiring large bodies of relatively inter-related science knowledge in school or university settings probably always begins as a symbolic knowledge situation. Students are asked to set aside concerns of their own reality and try to concentrate on integrating and differentiating the new science knowledge. In microbiology there would be two different situations
    (1) The vines are separate, e.g. areas of cell wall structure, metabolic pathways, enzyme kinetics. This is highly abstract material which has to be learnt and integrated in the absence of connection to the real world. Students may slowly build up real world experience in laboratory classes.

    (2) The vines have small branches intertwining. This is where students have some relevant real world experience, e.g. areas of medical microbiology (where learning is aided by students'

understanding about the beneficial effects of normal bacterial flora) or photosynthesis (where learning is aided by students' everyday experience with growth of green plants).

In both situations (1) and (2) there would be development of the new vine of symbolic knowledge and gradual intertwining with smaller or larger parts of the students' vine of intuitive knowledge. West and Pines (in press) use the term *conceptual development*.

In the biological sciences generally there appears to be no exact equivalent of the minor conflict situations reported in physics. This is where the two vines overlap but instead of intertwining the small branches are in conflict. Students' real world experience clashes with the (symbolic) knowledge of scientists. Authors write of *student misconceptions* as they describe strategies for making clear to students the reasons for physicists' special use of common words like force or work and for finding ways of fostering integration between the two vines. West and Pines (in press) call this *conceptual resolution*.

TECHNIQUES FOR MEASURING STUDENTS' UNDERSTANDING

Table 1 shows a list of some of the techniques used for collecting data on students' cognitive structures (Stewart, 1980; Fensham, Garrard and West, 1981). These may be roughly classified according to the different theory backgrounds discussed above. Clinical interview, the technique derived from Piaget's work, and solution articulation (where students are requested to articulate a solution to a science problem posed by an interviewer) share some common features. Word association tests are those where students are asked to list a large number of words associated in their memory with a science word nominated by the researcher. Researchers in this field (e.g. Shavelson, 1974; Preece, 1978) did not make much explicit use of theory and, as well, Stewart (1979) also criticised the tests on the basis that apparently meaningless associations were permitted and that there was no basis for recognition of the truth of propositions.

Table 1: Techniques for measuring students' understanding of science concepts

1. Clinical interview
2. Solution articulation
3. Word association
4. Sentence generation
5. Card sorting
6. Concept map
7. Tree construction
8. Concept relations task
9. Essay
10. Thinking aloud protocols
11. Stimulated recall

Techniques 4-9 have been used by researchers many of whom explicitly based their methods on Ausubel's theory or the work of Novak (1977, 1980, 1981) which was in turn based on Ausubel. Sentence generation involves students in writing an exemplary sentence following a prompt from the researcher. Card sorting in its simplest form involves students sorting a pack of cards, each labelled with the name of a science concept, into groups of like and unlike. Cards may also be arranged in map form with students being asked to insert and label connecting lines of the concept map to demonstrate their understanding of the propositional relationships. Tree construction also shares some similarities but students are asked to connect concepts in a way which demonstrates their degree of relatedness. Concept relations tasks also share similarities with concept mapping but place greater emphasis on definitions and descriptions of the concepts rather than the researcher simply accepting that the student understands the meaning of a concept label and shares that meaning with the researcher. Essays of course can be used for many purposes but it has proved possible to reconstruct them into the form of concept maps or semantic networks.

Thinking aloud protocols and stimulated recall techniques have been consistently used by cognitive psychologists working within an information processing framework, and together with prompted interviews these techniques have also been used in phenomenological research.

CONCEPT MAPPING IN THE BIOLOGICAL SCIENCES

A technique for mapping students'understanding of science concepts has been developed for use in both teaching and educational research. Its use in biology and microbiology will be described here. Earlier work by several authors served as a foundation for developing this concept mapping procedure. The general method of construction followed that of Novak (1980, 1981) for unprompted maps. The use of card sorting with adhesive labels follows West (1980) and Cronin, Dekkers and Dunn (1982) but without questions of degree of relatedness. The technique for eliciting propositional relationships was specifically developed for the present study.

The instructions issued to students for concept mapping on the topic of photosynthesis are shown in Figure 1. A map constructed by a second year university student is shown in Figure 2. This shows the students'own map and no attempt is here being made to point out any points of departure from the maps of science experts.

The concept mapping task is undertaken by students in class settings, i.e. not working individually with an interviewer but following the set of written instructions. Students are provided with a large sheet of paper (30cm x 40cm) and a set of adhesive labels each with a word or phrase representing a concept. For convenience these are printed in bulk using a word processor. In concept mapping, both the concepts and the connecting propositions are of major importance. Thus, students are required to arrange the concept labels into a map or network which satisfies their understanding of the topic then peel the backing off the labels and fix them to the large sheet of paper. The next step is for students to connect the concepts on the map with lines representing relationships and label each with a proposition. This usually proves the most difficult step.

CONCEPT MAP/CARD PACK

Please construct a concept map of PHOTOSYNTHESIS as it occurs in green plants. The procedure is as follows:

(1) Take out the card pack which you have been given and read the cards. Each card contains a concept related to photosynthesis. As you will see most of these are NOUNS (names of substances, processes, chemical formulas etc.) or SHORT PHRASES.

(2) Sort the cards into groups which seem to you to be most closely related

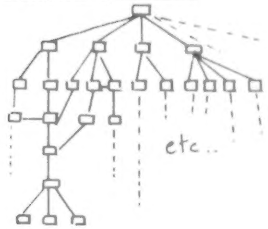
(3) Arrange the cards on the large sheet of paper to show interrelationships. Construct your map using the scheme shown diagrammatically below It should be arranged down the page as a HIERARCHY from most inclusive (general) to least inclusive (specific examples).

(4) Join all concepts with lines and LABEL them to show their relationships Many of the propositions are likely to be VERBS (actions). Common relationships include -
Cause/effect: causes, produces, drives, results in
Structure/function: involve, are associated with
Whole/part: is composed of, breaks into
Set/subset: has different types, is divided into, contains examples of

When you are entirely happy with your arrangement remove each card from its adhesive backing and stick it firmly on the map.

(5) Please arrange your left-over cards at the bottom of the map grouped as RECOGNIZED BUT UNGROUPED or UNRECOGNIZED AND UNGROUPED. There are cards with these headings .

SCHEME OF CONSTRUCTION



Most inclusive

Least inclusive
Specific Examples

(1) ☐ = concept

(2) —— (connecting lines) = propositions. Each must be LABELLED to show relationships (structure/function, parts of, example etc.).

(3) Cross lines are shown where concepts are integrated. Each line must be LABELLED.

EXAMPLE. A simple concept map (school level) for EVOLUTION.

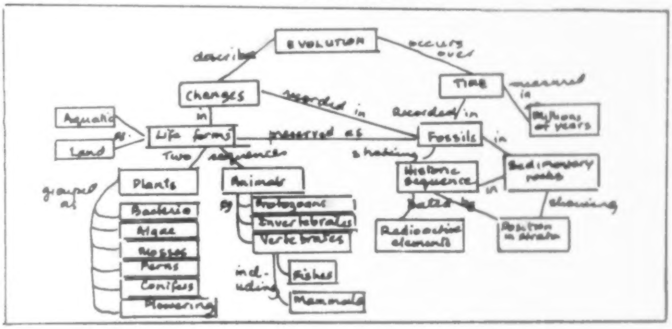

EVOLUTION
describes
occurs over
TIME
measured in
Millions of years
Changes
recorded in
Recorded in
in
Aquatic
Land
as
Life forms
preserved as
Fossils
in
Two sequences
showing
Historic sequence
Sedimentary rocks
in
grouped as
Plants
Animals
eg
Bacteria
Algae
Mosses
Ferns
Conifers
Flowering
Protozoans
Invertebrates
Vertebrates
including
Fishes
Mammals
dated by
showing
Radioactive elements
Position in strata

Figure 1: Instructions to students for concept mapping in the biological sciences

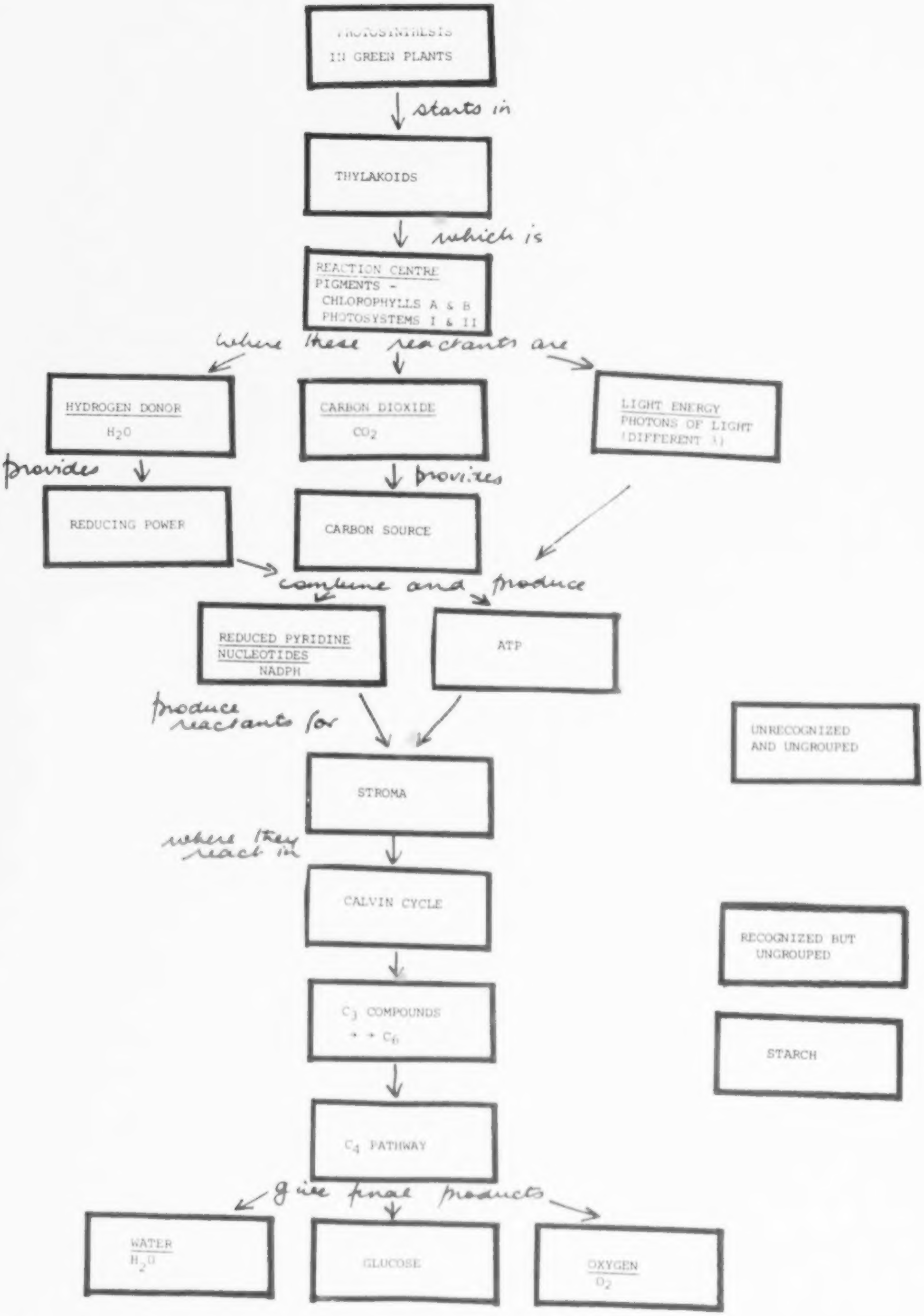

PHOTOSYNTHESIS IN GREEN PLANTS
starts in
THYLAKOIDS
which is
REACTION CENTRE PIGMENTS - CHLOROPHYLLS A & B PHOTOSYSTEMS I & II
where these reactants are
HYDROGEN DONOR H_2O
CARBON DIOXIDE CO_2
LIGHT ENERGY PHOTONS OF LIGHT (DIFFERENT λ)
provides
provizes
REDUCING POWER
CARBON SOURCE
combine and produce
REDUCED PYRIDINE NUCLEOTIDES NADPH
ATP
produce reactants for
STROMA
where they react in
CALVIN CYCLE
C_3 COMPOUNDS → → C_6
C_4 PATHWAY
give final products
WATER H_2O
GLUCOSE
OXYGEN O_2
UNRECOGNIZED AND UNGROUPED
RECOGNIZED BUT UNGROUPED
STARCH

Figure 2: Concept map of photosynthesis constructed by second year university student.

EVALUATION OF CONCEPT MAPS

Concept maps provide a rich array of data and are easy for students and teachers to work over on a one-to-one basis. Unfortunately this richness becomes a problematic feature in research work or when it is necessary for teachers to evaluate concept maps systematically. When it is necessary to process more than two or three maps, a scoring scheme is required.

In his scheme for evaluating student-constructed concept maps, Novak (1980, 1981) allocated scores under five headings: Relationships, Hierarchy, Branching, General-to-Specific, Cross-links. Of these, Relationships, Branching and Cross-links seem congruent with Ausubel's learning theory and could function as a measure of differentiation between concepts. A problem with Hierarchy and General-to-Specific is that they have proved more suited to concept maps with an underlying structure of reaction flow charts, taxonomy or classification. The differentiation by Cronin, Dekkers and Dunn (1982) of Propositional Relationships into simple propositions and scientific propositions proved a helpful addition. The scheme which has been used in biology and microbiology is shown in Table 2. Clear operational definitions of the scoring procedures are provided.

Table 2: Evaluation of Concept Maps

Evaluation Criteria	Definition	Scoring Procedure
Concept recognition	Concepts are objects, events, situations or properties of things that are designated by a label or symbol	Count concepts. Score separately for presence, labelling, correctness
Propositions	Concepts acquire meaning through the relationship between concepts. The relationships are represented by connecting word(s) or phrases written on the line joining any two concepts, i.e. labelling essential	Count propositions. Score separately for presence and correct use of simple or scientific propositions
Branching	Branching of concepts refers to the level of differentiation between concepts. Where appropriate restrict this to the extent more specific concepts are connected to more general concepts	One point for each branching point which has at least two statement lines. Score separately for presence and correctness
Cross-links	Key conceptual links between major structures of a map, i.e. labelling essential	Count links only if present and correct

A major problem with the scoring procedures used by Novak (1980, 1981) and Cronin, Dekkers and Dunn (1982) is that no explicit representation of the subject matter is shown. Novak introduced the term "content correct" with "correctness" of the subject matter used by the student being compared with an "expert" version. However the actual concepts used were not recorded in Novak's scheme. Thus the scoring procedures available to date contain no reference to particular concepts nor to the nature of the relationships between them. Yet to lose reference to the subject matter means to use the very types of evaluation procedures which led to the development of concept maps in the first place. What is wanted is a dual purpose scoring procedure where the scoring scheme itself refers to the specific concepts used and where also numerical scores can be allocated. The most useful standard procedure for this is Guttman scaling where an array of criteria are used to specify the ideal or top level of performance and where criteria are withdrawn in stepwise fashion to form lower levels of the scheme. In a move in that direction, Champagne et al. (1978, 1981) reported a rating scale for scoring a task on classification of rocks. It required stepwise judgements of students' success in dealing with both the hierarchical and transformational structures of rocks. However, the two types of structures were judged together rather than separately and no specific concepts were included in the definition of the scale.

The scheme shown in Table 3 is a type of Guttman scale for use with concepts in photosynthesis. Classes of responses are defined as levels. For the sections of maps dealing with the central concepts of requirement for a hydrogen donor and production of chemical energy (in the form of ATP) and of reducing power (in the form of NADPH), correct use of these three concepts (primary concepts) and three others (secondary concepts) is required for a map to be awarded the highest score (5). For lower level scores, requirements for concepts are removed in sequence beginning with those of lesser scientific importance (secondary concepts).

Table 3: Concept class scores

	PRIMARY CONCEPTS				SECONDARY CONCEPTS		
Level Score	(H. source required (ATP generated (NADPH generated				(Light (Reaction centre (O_2 production		
	Number of these 3 concepts represented:-				Number of these 3 concepts represented:-		
	1	2	3		1	2	3
5	✓	✓	✓		✓	✓	✓
4	✓	✓	✓		✓	✓	-
3	✓	✓	-		✓	-	-
2	✓	-	-		✓	-	-
1	✓	-	-	or	✓	-	-

A score of (✓✓-) means the student has correctly used any two of the specified three concepts

A score of (✓--) means the student has correctly used any one of the specified three concepts.

DISPLAY OF SCORES

To summarize the results of these scoring procedures, various display methods can be used; (1) simple display of numerical scores, (2) expression of scores as percentage of an ideal or baseline score (Novak, Gowin and Johansen, 1983), (3) histograms which may be arranged in profile form for individual students (Cronin, Dekkers and Dunn, 1982). The profiles technique of concept class scores could be adapted for group scores (4) scoring (from Guttman scales such as that shown in Table 3) as shown in the following stylized example (Table 4).

Table 4: Monitoring students understanding of photosynthesis. Concept class scores (stylized)

Group of students (N = 50)	Concept class scores. Levels Low 1	2	3	4	5 High
Second year Pre-test	15	20	10	5	0
Second year Post-test	10	15	15	5	5
Third year (same students one year later) Post-test	5	5	10	20	10

CONCLUSION: USES OF CONCEPT MAPPING

The uses of concept mapping for research and teaching purposes are distinct.

In research, concept maps are a promising way of obtaining status data on students' understanding (or lack of it) in key concept areas and they can be used to monitor the process of students' conceptual development. They could therefore be useful in monitoring change from pre-instruction to post-instruction and in the research tradition of novice vs. expert comparisons. As well as comparison of students' maps with experts (who may be teachers or panels of science education subject matter specialists) the technique invites comparisons of student conceptual development vs. the content structure of curriculum materials. Lastly there remain a number of untested propositions in learning theory (especially Ausubel's propositions of subsumption, progressive differentiation and integrative reconciliation) for which concept mapping is a promising research tool.

Some uses of concept mapping in teaching have arisen independently, others following from research projects. Researchers commonly noticed the compelling effect on students of the task of preparing a concept map. Students claimed they "saw the light", "pennies dropped" and so on. The main function seemed to be vivid realization of problems - concepts unrecognized by the student or recognized but unable to be connected to other concepts in any but the vaguest manner, i.e. problems in specifying propositional relationships. This in turn produced a desire for improvement and many students have offered to go away, study the topic again and attempt to construct an improved map. Thus concept maps may be recommended as a powerful student learning aid. In a similar way teachers can examine students' maps as a diagnostic aid and use their findings to help individual students or groups of students who seem to share learning problems. The idea of a teacher simply presenting students with his or her own prepared map has several disadvantages. It unintentionally promotes an unfortunate notion of science as fixed, correct, immutable. It also lacks motivation, ownership and involvement for students. However teachers have found ways to build up slowly one or more concept maps as lectures or tutorials progress as a way of communicating lesson or course structure to students.

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DEVELOPING DISTANCE EDUCATION IN MALAYSIA: A PROJECT BY UNIVERSITI SAINS MALAYSIA, DEAKIN UNIVERSITY AND MURDOCH UNIVERSITY

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Writing in 1981, the Coordinator of the Off-Campus Academic Programme at Universiti Sains Malaysia described their distance teaching quite modestly, as "in its embryonic stage of development" (Ali Ahmad, 1981). In fact the achievements are substantial. Nine hundred Malaysians have obtained bachelor degrees in Humanities, Social Sciences and Science (Mathematics, Physics, Chemistry, Biology) through USM's Off-Campus Programme during the period from inauguration in 1971 until 1983 (1). With about 30 percent of USM's BA and BSc enrolments in the distance teaching mode, and achieving about 65 percent graduation from each intake, Off-Campus has secured the confidence of policy makers.

USM has firm plans for major expansion of distance education (DE) enrolments, in accordance with national priorities for the supply of graduates, and its role as the sole provider of University level education in this mode. Off-Campus enrolments, now about 1000 students, are projected to double in the next 5 years (Leong and Dhanarajan, 1983). To achieve this expansion, USM is making a particular effort to utilise international resources for staff development and improvements to course design. The Library has the necessary resources, including a wide range of samples of DE materials; a high proportion of USM staff have overseas experience from higher degree work, study leave or conference travel; formal courses are available for staff training (Elton, 1981; Elton and Manwaring, 1981); a number of consultants on distance education have worked at USM (for example, Jenkins and El-Bushra, 1982; Gough, 1983); and in 1981 USM conducted a major conference on distance teaching (Dhanarajan and Lim, 1981).

Indeed the situation facing USM staff in DE is similar to that which occurs in many institutions in Australia : an established DE system which is exchanging with the rest of the world a flood of information and ideas on what to do and how to do it. How were we to plan our part in the DE development project which Deakin and Murdoch Universities commenced with USM in 1983, under sponsorship from the Australian Universities' International Development Program (AUIDP)?

In this paper we try to identify a "development theme". We sought a way to structure our information exchange with USM for coherence and effectiveness, by analysing key aspects of the DE context at USM, with particular reference to sciences and mathematics. We show how these perceptions influenced our part of the AUIDP-USM project and linked it to developmental work with Murdoch's DE courses.

AIMS OF THE USM-AUIDP DISTANCE EDUCATION PROJECT

Proposals for this project emerged at the time of a major restructuring of the USM Off-Campus Programme, which now provides for a minimum of five years of part-time distance learning, followed by one year of full-time on-campus study. As all first degrees are with honours, the normal study period for full-time students is four years. Off-campus students in science are required to complete a double major chosen from Mathematics, Physics, Chemistry and Biology. A progressive phasing in of the new curriculum commenced in the 1983-84 academic year. In conjunction with redesign of the science curriculum, including detailed specification of the content and objectives for each course, USM aimed to upgrade the design of printed materials, introduce new media, accelerate the changeover from English to the national language (Bahasa Malaysia), and improve the delivery and student support services.

The USM courses are usually the work of one academic, seconded from a School for a period of one or two semesters, and assisted by a variety of services. Staff in the Off-Campus Unit are the main providers of internal services, but the scope for editorial and design consultancy is constrained by the limited numbers of permanent academic staff in Off-Campus. The main external assistance for the academics working in 1982-83 on the new courses for 1983-84 was a month-long writing workshop (Jenkins and El-Bushra, 1982). Participants in this workshop endorsed suggestions for a longer period of training in course writing at overseas institutions. Thus in 1983 the main external assistance for the new course writers was conceived as three-month "internships": 6 writers from Humanities and Social Sciences attending Deakin University (June-August 1983); 4 writers from Mathematics and Physics at Murdoch University (August-November 1983); and 4 writers from Chemistry and Biology at the Open Learning Institute, British Columbia (Timmers, 1984). The groups at Deakin and Murdoch Universities were sponsored by AUIDP; additional funds for engaging temporary staff were also provided by AUIDP.

The intitial aims for the present project were to develop practical skills in writing DE materials, for staff who were well qualified in their disciplinary specialities, but not intending to become DE specialists. These aims are consistent with outcomes from earlier years, and reflect the continuing influence of some contextual factors. Firstly, the emphasis on writing skills arises from the importance of integrating study organisation and active learning exercises into the conventional text exposition of course content, and the relatively low availability of appropriate text books and audio-visual materials either prepared in Bahasa Malaysia or translated from another language. Secondly, the emphasis on disciplinary speciality is in accord with the usual practice of matching undergraduate teaching duties to an academic's specialist expertise. For example, organic chemists teach organic chemistry, but not physical or inorganic chemistry. As similar specialisations occur in each of the science disciplines, the training for course writers must be repeated each year for a new group of academics.

We commenced the Murdoch part of the present project by expanding the initial aims into a detailed "statement of expectations" about the desired outcomes, which was modelled on ideas about learning contracts. The "statement of expectations" developed from a study of the context for science DE at USM and the needs of the major parties: the four USM staff allocated to Murdoch, and the distance students who enrol in these courses (2). We wanted to avoid focussing our expectations entirely on the techniques of writing for distance students. We wanted purposeful writing, directed by a tight link to the major developmental tasks which face science DE in the USM context.

DEVELOPMENT CONTEXT FOR DISTANCE EDUCATION IN SCIENCE

The most immediate task for USM Off-Campus is to improve completion rates in Science courses, which are lower than the completion rates in Off-Campus Humanities and Social Sciences, or Science in the on-campus mode. (The completion rate is the number of students who complete a course successfully, expressed as a fraction of the number of students who commenced the course). In particular, Science is striving to achieve a better relativity in opportunities for bumiputra (ethnic Malay) and non-bumiputra students. In Humanities and Social Sciences the numbers of graduates for the major ethnic groups are in accord with the allocations of university admissions, but Science is experiencing difficulty in attracting and retaining bumiputra students. This contrast between "arts" and "sciences" is less significant in on-campus classes, which have satisfactory completion rates for all groups. In the context of problems with completion rates in Off-Campus Science, the developmental task focussed on a search for insights into the characteristics of distance learners, which could indicate potential innovations and refinements in course design and delivery. The question to be asked is why DE "works" for a particular group in some disciplines of study, but not in others.

A further task for USM is to refine the organisation of staff resources for DE in the context of a two mode campus. For most academics in USM Science, workloads in conventional face-to-face teaching predominate over the less regular allocation to preparation of DE courses. Furthermore, few academics are involved directly in distance tutoring, which is conducted by part-time staff while in most cases the contacts which full-time staff have with their DE students are confined to the annual on-campus sessions. The addition of the DE mode to existing teaching leads to problems in organising the optimum combination of disciplinary specialists, who determine what the course objectives are, and DE specialists who can provide essential guidelines on how to achieve those objectives.

In addition to the major tasks, several other aspects of the USM context influenced the project planning. We formed a subjective impression that USM academics are achieving high standards in writing printed materials for DE courses. The four USM staff allocated to Murdoch were not a group of novices. Therefore we expected them to participate in our distance teaching and to provide informed criticism of our courses, in addition to their work on their own courses. As USM has been importing academic expertise for many years, we felt that a "collaborative" style should be promoted for the project by linking it to the efforts to improve Murdoch's DE courses.

The four USM staff allocated to Murdoch, though strongly committed to their respective DE courses, were not potential full-time specialists in DE. Thus the expectations about their longer term involvement in DE were agreed as "being able to act as resource persons : a source of advice to colleagues, as catalysts for innovation, and critical reviewers of course design" within their respective Schools.

LEARNER CHARACTERISTICS AND DISTANCE TEACHING STYLE

Returning to the question of why DE "works" for a particular group in some disciplines of study but not in others, we emphasised "a belief in the importance of recognizing individual differences not just in ability, but also in personality and motivation" (Entwistle, 1981). Recognition of the influences of personality and motivation factors in distance learning, though occurring frequently in DE literature, is not guided by theoretical insights. This gap may have occurred because DE research into preferred styles of learning is deterred by the risk of finding that some types of students should not enrol in DE because their preferences are quite inconsistent with the style offered by DE courses. In the absence of constructive interpretations from DE research literature, we examined cognitive style research for insights into science DE problems (Entwistle, 1981; Wilson, 1981; Messick, 1976; Witkin, 1976; Witkin et. al., 1977).

The field dependent and field independent dimension of cognitive style, studied extensively by Witkin's group (Witkin et. al., 1977) was selected as a stimulating model for sensitising science courses writers to issues in distance learner characteristics, rather than as a construct with proven relevance. Research results in the Malaysian cultural context were not available, though there are some indications that Malaysian DE students perceive themselves as "disadvantaged" because their expressed needs for personal and social contact, and explicitly directive study materials are not fulfilled (Choo, 1981). Wilson (1981) commented on the relevance of this dimension:

> Cognitive style has implications both for what students learn and how they should be taught. Field dependents pay more attention to social materials and learn and remember them better; they are also more susceptible to external motivation and sensitive to personal criticism; they find it difficult to structure material, but can learn materials which are highly structured, such as programmed learning, as effectively as field independents; they tend to pay attention to the salient cues in a learning situation and may neglect the less salient, and, as suggested above, they adopt passive as opposed to active learning strategies. (p.141) ... the research highlights important individual differences in perception which explain why students are likely to find certain fields of study congenial. Although students working within the subject area which matches their cognitive style do appear to have somewhat higher achievement than unmatched students, perhaps the more important contribution of the research to the study of academic performance is in helping to explain such factors as persistence, drop out and transfer. (p.142)

Distance learning in science may confront relatively field dependent students with two major disadvantages. Firstly, Witkin et. al. (1977) review evidence that field independent students tend to favour and perform better in mathematics-science based disciplines which call for particular analytical, spatial visualisation and restructuring skills. Secondly, field dependent students display greater attentiveness to social cues (Witkin et. al., 1977), and it seems reasonable to infer that if we do have relatively field dependent DE students, they will be disadvantaged by having a very high proportion of their study conducted alone, without immediate, socially oriented, verbal reinforcement. Chuah and Myint (1981) prefaced their suggestions for improvements in the design of self-instructional materials for USM Off-Campus with the comment:

> Self-instructional materials may not work well with students who require prodding by other people. It can be a very lonely experience. Usually, the self-instructional method is best used with other methods of instruction, e.g. discussion at the Regional Study Centres. (p.5)

The USM science curriculum does not have a course which provides explicitly for beginning students to acquire and practise the skills required for successful DE study. Induction of students into DE is therefore conducted within the context of conventional first year subject areas. As economic circumstances generally preclude significant use of individual telephone tuition, and a system of formative assessment through assignment interchange is not well developed (Chuah and Choo, 1981), socially oriented support or "prodding" which may be critical for field dependent students is confined to face to face tutorials with part-time tutors at intervals of one to two months. Off-Campus also has a half hour radio broadcast each week on the national network. A further problem arises from the strategy for managing the high demand for access to university study, which prevents students who have been awarded a DE place in Science from changing to Social Sciences, Humanities or on-campus study. The alternatives are to persist in Science DE, or withdraw from the university. Given this picture, and assuming that at least some of the Science DE learners are field dependents, what are the practical implications for a course writer? We insisted that at least some of the students in DE courses will :

(a) show greater attentiveness to social cues; seek verbal messages with social content; prefer a personalised, conversational style; and appreciate simulated tutorial discussions on audio tapes.
(b) benefit from personalised, supportive feedback provided by tutors who are sensitive to cognitive style issues.
(c) prefer and expect their learning to be highly structured with minimal uncertainties about techniques, and explicit directions wherever possible on resolving learning difficulties.

These emphases, added to conventional advice on distance methods and media, are not novel, but the development of new styles of design is easier if backed by a basis for understanding why certain features are desired. We feel that cognitive style research in dimensions such as field dependent and field independent does offer a basis for exploring relationships between personality, motivation, and the design of DE courses. This issue is not exclusive to science DE at USM; the potential relevance extends to all cultural and disciplinary contexts. In our planning and conduct of the project at Murdoch, we emphasised in individual discussions and seminars that we were linking Murdoch and USM needs, in a common approach to knowledge and attitudes about cognitive style characteristics of distance learners.

Turning to the question of cognitive ability characteristics, we followed Messick (1976) in distinguishing ability and style, and continued to link the needs of Murdoch and USM students. Murdoch provides "bridging" DE courses covering any gaps which students may encounter between their educational backgrounds and the level and content of the tertiary admission examination syllabus in mathematics (including calculus), physics or chemistry. Murdoch students enrol in whatever combination of bridging courses is required for their programmes; the enrolments earn credit towards a degree. By contrast, the USM bridging DE courses do not earn credits towards a degree. Courses in mathematics, physics and chemistry are taught by Off-Campus in "Kursus Sains Pemulihan" (Science Foundation Course) for bumiputra students. However in other aspects the USM and Murdoch courses are similar, particularly in the aspect which we identified as "cognitive level". We aimed to emphasise developmental models of student learning, for example as in Wilson (1981); hence the focus on "level" rather than "ability", and a deliberate use of elementary courses as sources for illustrative examples when discussing conceptual difficulties.

Examples of contrasts between expected and observed competencies with problem solving in tertiary science and mathematics were obtained from Murdoch courses, USM courses and elsewhere - typical sources included Thornton (1982), Herron (1975), Fuller (1982) and Karplus (1977). Our discussions covered a variety of interpretations of conceptual difficulties and strategies for overcoming these; the main point was to review teachers' attitudes. Conceptual difficulties in mathematics and science courses may be perceived as evidence for low ability, or as characteristic for a particular level of cognitive development, depending on the teacher's attitude. The rich variety of models now available for understanding student learning in higher education, as in Wilson (1981) and Entwistle (1981) for example, does not lead readily to acceptance by scientists and mathematicians that weak students can "learn to learn". It seemed to us that the spectrum of teacher attitudes was similar at USM and Murdoch: "low level" teaching has a low status, and most teachers have high or even unrealistic expectations about students' acquisition of concepts and skills in prior courses. Nevertheless, we persisted with the view that DE courses, particularly first year courses, should contain a variety of learning pathways, for example as in Jennings and Atkinson (1982). Using a broad analogy to Piaget's theories (e.g. as in Fuller, 1982), use of both "concrete" and "formal" pathways is desirable for a wide range of science and mathematics learning tasks; to not do so is ignoring an important characteristic for many DE learners.

We recognise that a productive understanding of learner characteristics does not guarantee improved design of DE materials. The mathematics and physics staff who were teaching courses similar to those in preparation by the USM academics provided critical comment on the draft materials. This process depends upon drafts in English; we have no expertise in scientific Bahasa Malaysia. However in this way we reviewed as best we could the basic techniques of writing for DE students. This commitment to "course development" continued in parallel with the study of learner characteristics which was directed at "staff development". We sought to incorporate into the draft courses model applications arising from the study of learner characteristics, wherever possible within the time and resource constraints. For example, a draft audio tape for "Matrices and Determinants" simulated a tutorial style discussion for students who may possess field dependent styles.

A DEVELOPMENT THEME

"Learner characteristics" emerged as a development theme during the planning and conduct of this project. The exchange of information between practitioners, even in the relatively young area of DE, threatens to be overwhelming unless a structured approach is available. The focus on learner characteristics is little more than standard advice to writers : know your audience. The broad division, between cognitive style as exemplified by the field dependent and field independent dimension, and cognitive ability from a developmental perspective, may be based only on qualitative evidence. However we see no harm in having all parties, whether USM or Murdoch, conventional lecturer or DE specialist, working within the context of a research front. We anticipate that cognitive style research will provide a coherent and effective framework for DE design decisions in a wide context. Thus the development theme of learner characteristics applies also to the Murdoch DE context, creating a collaborative link between DE work at both institutions.

NOTES

(1) All statistical data have been provided by the Off-Campus Academic Programme, USM.
(2) This study and other preparations for the project were undertaken by Roger Atkinson during a 3 month visit to USM prior to the commencement of the internships at Murdoch; the provision of facilities by USM and support from AUIDP is gratefully acknowledged.

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WHAT ROLE DOES MATURITY PLAY IN UNIVERSITY PERFORMANCE?

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A recent report (Clift, 1984) analysed the performance toward graduation of a sample of students matriculating in 1978 at one New Zealand university and entering for an Arts, or Commerce, or Science degree. For this sample, the percentage of the older students, that is 25 years and over, graduating within a five-year period was significantly lower than for the younger students (see Table 1). This could be explained by the very high proportion of older students who are part-time. However, a further analysis showed that, within the various entry categories, the younger students, that is 17-18-year-olds, had a higher graduation rate than students 19 years and older, and this raises the question of the effect of age on university performance.

Miller (1970) noted that

> age of the student seems to have some association with university achievement, but the nature of the association requires careful interpretation. (p. 8)

From a review of more recent studies looking at the performance of mature students in Australia, Barrett (1980) concluded that "mature age students, however selected, perform at least as well, if not better than the 'normal' student" (p. 54).

Within the New Zealand university system, is there a significant difference in the performance of the younger students with minimum school preparation compared to the older students who left school without University Entrance and matriculate under a Special Admission clause in the University Act?

This study attempts to answer this question by an analysis of the performance of three cohorts of students matriculating for entry to the same New Zealand university in 1981. The cohorts were drawn from those with minimum school-leaving qualifications and those entering the university under a 'Special Admission' provision.

Table 1: Graduation rate x age (1978) matriculants

Age	Percentage of entry graduating
17-19	57.8%
20-24	35.3%
25+	16.6%

THE SAMPLE

Entry to New Zealand universities has been described as an 'open entry' system (OECD, 1983). The minimum academic qualification is University Entrance. This can be accredited, having completed a satisfactory Sixth Form year (UE accredited), or achieved by sitting a national examination (UE exam). Each year, approximately 20% of all first year university students matriculate with this minimum qualification. A student, having achieved UE and having remained at school for a Seventh Form year, can be accredited with the Higher School Certificate (HSC). Those with HSC account for another 20% of those matriculating in any one year. However, the majority of students remaining at school for a Seventh Form year sit a national Bursary examination, and these Bursary students account for about 46% of the total matriculants.

A number of students leave secondary school without qualifying for University Entrance. These students may, on reaching the age of 21 years, apply for entry to a university. By far the greater number of the older students enter under the provisions of this 'Special Admission' regulation.

This study used three cohorts of students, drawn from the 1981 matriculants, entering for an Arts, Commerce, or Science degree. The three cohorts:

(1) those matriculating with UE and under the age of 21 years;

(2) those under the age of 21, having spent a year at school following UE and thereby achieving HSC; and

(3) those older students matriculating under the Special Admission provisions;

have obviously achieved to different academic levels at school. However, some with minimal school-leaving qualifications, that is UE, would have come directly from school with a very good academic record. In fact, these high achievers are eligible for a Fees Bursary by achieving a grade of 12 or less in the Sixth Form Certificate. This Certificate is issued at the complation of the Sixth Form and shows the grade, from 1-9, that the pupil has achieved in each subject. The sum of the grades over the pupil's best four subjects is then given as the Sixth Form Certificate mark.

A correlation study, using Pearson's r and a sample size of 816, produced a correlation of -0.69314 between the Sixth Form Certificate grade and Bursary mark. The negative relationship is due to the reverse nature of the Sixth Form Certificate scale. The correlation is highly significant beyond the 0.001 level.

Within the UE and HSC cohorts, these high achievers make up 39% and 19% of the groups respectively (see Table 2). These differences provide a significant difference in school achievement between the three cohorts, with UE having the higher proportion of high achievers.

The three cohorts differ also in age distribution (see Table 3). While the distribution of ages in the UE and HSC cohorts is similar, containing all the younger students, by definition the Special Admissions are in the over 21 age category but with a high proportion of mature students.

Table 2: UE and HSC cohorts x 6th Form grade

		UE		HSC	
		N	%	N	%
6th Form grade	4-12	94	39%	43	19%
	13+	139	58%	183	80%
	No data	8	3%	2	1%

Table 3: Age at entry

	UE		HSC		Special Admission	
	N	%	N	%	N	%
17-18	110	46%	80	35%		
19-20	131	54%	148	65%		
21-24	-	-	-	-	36	26%
25+	-	-	-	-	102	74%
TOTAL	241	100%	228	100%	138	100%

The number of females entering under UE and Special Admission are significantly greater than for those entering under HSC (see Table 4). All differences between the three cohorts are significant (>.001) on the chi square test.

Another significant difference (>.001) is the inter-cohort differences in the full-time/part-time status of the entering students. Full-time status is defined here as a student who, during both years over which the statistics have been gathered, enrolled for a full-time course representing 72 Bursary points. As can be seen from Table 5, the greater number of full-time students are in the HSC cohort, and the greater number of part-time students are in the Special Admission cohort.

Table 4: Distribution of sexes

	UE		HSC		Special Admission	
	N	%	N	%	N	%
Male	90	37%	139	61%	48	35%
Female	151	63%	89	39%	90	65%

Table 5: Full-time/Part-time status of students

Status	UE		HSC		Special Admission	
	N	%	N	%	N	%
Full-time	98	41%	153	67%	13	9%
Part-time	143	59%	75	33%	125	91%

PERFORMANCE

To assess the performance of the students in the different cohorts, a grade index was used. The level of achievement in any one course is on a scale of 0 (fail) to 4 ('A' pass). The sum of these scaled achievements is then divided by the number of courses entered for to produce the grade index. The mean grade index for each cohort is shown in Table 6. The difference between all three means is significant (>.01). As 90% of all Special Admissions were part-time, it is not possible to compare performance on a full-time/part-time basis.

However, for the UE, HSC cohorts, the mean grade index for full-time students is significantly higher (>.01) than for the cohort overall. While the mean grade index for the full-time UE cohort is significantly higher than for the overall Special Admission cohort, this is not true for the HSC full-time students (see Table 7).

The mean grade index analysed by age and entry is shown in Table 8. The mature students' mean grade index is significantly higher than for any of the other three age categories. The only sub-groups to exceed this value are full-time UE students in both age categories of 17-18 and 19-20.

In all three cohorts, females have a higher mean grade index than males (see Table 10).

The'high' achievers in the UE and HSC cohorts stand out with significantly higher mean grade indices than the 'normal' students (see Table 9).

Table 6: Grade Index

	Mean	S.D.	Standard Error of Mean
UE	1.141	0.88	0.057
HSC	0.943	0.67	0.044
Special Admission	1.324	1.022	0.087

Table 7: Mean grade index for full-time students

UE	Full-time	N	98	M	1.605	SD	0.83
HSC	Full-time	N	153	M	1.175	SD	0.58
Special Admission	All	N	138	M	1.324	SD	1.022

Table 8: Mean grade index x age x entry

	17-18			19-20			21-24			25+		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
UE	110	1.3	.87	131	1.0	.88						
HSC	80	1.0	.68	148	0.9	.6						
Special Admission							36	.8	.8	102	1.5	1.0

Table 9: Mean grade index by 6th Form achievement

(a) UE cohort

	4-12			13+		
Status	N	M	SD	N	M	SD
Overall	94	1.7	.91	139	.8	.66
Full-time	62	1.9	.85	33	1.2	.51

(b) HSC cohort

Status	N	M	SD	N	M	SD
Overall	43	1.2	.66	183	.9	.66
Full-time	32	1.3	.60	120	1.1	.57

Table 10: Mean grade index x entry x sex

	Male			Female		
	N	M	SD	N	M	SD
UE	90	1.0	.81	151	1.2	.91
HSC	139	.8	.59	89	1.1	.74
Special Admission	48	1.1	1.13	90	1.5	.94

DISCUSSION

The analysis supports the Australian studies showing the high performance of mature students relative to the younger students matriculating with minimum school qualifications (West, Hore and Eaton, 1980 and Isaacs, 1982). This study does not consider attrition rates at the end of the first year, which in an earlier study were found to be higher than average for the UE and Special Admission categories of entry, mainly amongst the part-time students.

What is interesting is the relatively better performance of the UE entry compared to the HSC entry. As noted, the HSC entry would have completed a Seventh Form year at secondary school, and one would expect them to be better prepared for university study. This does not appear to be so, as they achieved below their UE counterparts, whether full-time or part-time, or high or normal school achievers.

A further interesting feature of the analysis is the significantly better performance of females compared to males in all three cohorts.

The analysis does support Miller's (1970) conclusion that the relationship between age and performance does need careful interpretation, and also the belief that other factors, such as orientation and study style, are important variables.

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AN APPROPRIATE CURRICULUM FOR PART-TIME STUDENTS

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Part-time tertiary courses are marked by high dropout rates. Thus a recent survey at the University of Western Australia reported that only 18% of a particular cohort had graduated (Anderson, 1982). Studies e.g. Mortimore and Bennett (1978) show that part-time students discontinue for reasons external to the University - family and work commitments, while full-time students usually drop out for reasons connected with their course. Ciastkowski, Harrison and Winter (1982) confirmed this view when they found that the major problems experienced by part-time students were pressures and demands of employment, insufficient time for study, and tiredness.

The usual reaction of institutions to these studies is to wash their hands of the problem. Generally speaking, part-time evening courses are identical with those taught during the day and little effort is made to accommodate the particular needs of part-time students. This paper will question the assumption that little can be done to alleviate the problem and suggests that a remedy lies in the design of courses for part-time students. It will focus in particular on the part-time student attending classes in the late afternoon and evening.

THE PROBLEMS OF PART-TIME STUDENTS

A few moments of reflection will provide a list of the problems facing part-time students but in order to confirm the list with evidence from experience, two surveys were conducted.

The first, by telephone, contacted a sample of 50 part-time students three times during a semester and asked them if they had experienced any problems in the past weeks at home, work or university that had hindered their studies.

The second, by mail, contacted students who had dropped out and students who had stayed in a degree programme. The purpose of the survey was to establish reasons for dropout and strategies adopted that enabled students to stay in the programme.

The major problem facing part-time students that emerged from the investigation is the most obvious, the sheer lack of time for study. Two important points follow:

- the time available to part-time students for study is much more valuable than for full-time students. It represents a very much smaller proportion of total time and, typically, major sacrifices have had to be made to make it available for study.

- there is little flexibility for part-time students in their use of time; demands of employment, and, often, home and family impinge strongly.

The lack of flexibility experienced by part-time students conflicts with the present inflexible nature of course demands and this conflict often leads to the student withdrawing from the course. This will be discussed later in the paper.

The kinds of problems experienced at home included a noisy environment with no particular place to study, family demands, the sacrificing of social life and some difficult mental adjustments required, e.g. 'learning to live in a pigsty while study problems take priority'. The surveys showed that students dropped out because some had little idea about either the impact of study on their lives and their families, or the exact nature of the course in which they had enrolled.

Events at work such as promotion requiring re-training and study, shift changes, extracurricular activities for teachers and travel away from home, may make sudden and unexpected demands on time.

There was evidence from the studies that poor and thoughtless organisation by the University also made study difficult, e.g. access to facilities after hours was difficult, programme changes occurred at short notice, and students were subjected to long contact hours with only short breaks.

Also unexpected events such as family crises, overtime requirements, business trips interstate or overseas, commonly led to students "dropping out", in part because they fell so far behind that they stood little chance of passing the assessment items. Once again their lack of flexibility defeated them.

Those students who persisted with their studies seemed able to overcome the problems mainly through good personal organisation, a determination to succeed (often in spite of the system) and strong support from their families. Fellow students also provided important support. None of these 'success' factors are related to the University and the nature of the courses, which might strengthen the assertion that 'little can be done by the University to assist part-time students'.

Nevertheless, there are features of courses that severely hinder part-time students which, if modified, could lead to a higher retention rate among those who perhaps do not possess the qualities as strongly as those in the persisting group. These course factors will be discussed in the next section.

FEATURES OF CONVENTIONAL COURSES

Some aspects of conventional courses that hinder part-time students are that:

(1) Courses are characterised by fixed time constraints. They are offered at a particular time of the year, and the assessment period is fixed as are the times of the classes.

Part-time students have little flexibility in their use of time, which means they are very vulnerable to events that cause them to fall behind in the work. Thus having no choice in the assessment time could mean being inadequately prepared and possibly failing in the course.

(2) Courses are usually designed in sequence, one topic building on another.

Understanding the course is thus very dependent on regular attendance. This is often impossible for part-time students particularly when unexpected events occur.

(3) Staff often teach with expectations that students will have ready access to learning resources and to themselves for consultation.

Part-time students have limited time available for extensive research and often have great difficulty in making contact with staff.

(4) Administrative arrangements are made that do not recognise the particular needs of part-time students. Examples that have occurred are sudden changes in field work, class times and scheduling of extra classes at short notice. Part-time students lack flexibility to respond to these changes. They need reasonable advance warning to be able to change arrangements.

(5) The learning activities are often not designed to make best use of part-time students' time on campus.

Those aspects of conventional courses that help part-time students are:

(1) The course provides deadlines to meet. The variety of pressures on a part-time student makes it imperative to have deadlines.

(2) The course requires a commitment to attend classes. Unless the student was highly disciplined, pressures would easily squeeze out study if there was no definite commitment of time.

(3) The course provides valuable social interaction. Learning occurs through group interaction with peers and teaching staff. Fellow students can also provide encouragement to continue with the course in difficult times.

Comparison of the features shows some contradictions, for example the constraints of fixed times versus the value of deadlines, or the difficulty of attendance versus the value of attendance.

The design of an appropriate curriculum for part-time students has to resolve these contradictions and give students flexibility to enable them to adjust their study to accommodate varying demands from other areas of life.

CHARACTERISTICS OF AN APPROPRIATE PART-TIME CURRICULUM

An appropriate part-time curriculum would have the following characteristics:

(1) Provision for students to control their study time but still be governed by realistic deadlines and progress rules. This may mean breaking free from the constraints of semesters.

The provision of greater flexibility for part-time students in a conventional evening course enables students to progress at different rates through the programme. This helps students who find it difficult to maintain a full load after being absent from regular study for a number of years.

(2) Where attendance at the campus is important the learning activities should be worthwhile and organised with plenty of notice.

(3) The course should be well documented so that if regular attendance at the campus is expected then missing a number of sessions will not be disastrous.

(4) Where possible a short bridging course should be held shortly before the course commences to assist part-time students to make realistic decisions about being able to fit up to 20 hours per week's study into their lives and to give a much clearer idea about the nature of the course.

These general criteria have been translated into reality in the part-time BA programme "Australian and Comparative Studies" which began at Griffith University in 1983. The features of this programme are:

(1) Students progress sequentially through the programmes at their own pace subject to minimal deadlines and progress rules. They do not have to attend for assessment at a particular time and study is not constrained to semesters or terms.

This provides the flexibility described in the first criterion and enables students to vary their study depending on their circumstances. At the same time there are deadlines to meet which provide incentive to study.

(2) The content of the course is contained in prepared written material. Thus students are freed from the need to be present regularly to keep up with the course.

(3) Campus attendance is not compulsory but tutorials, seminars and opportunities for consultation with staff are provided at intervals through the semesters.

(4) The degree is divided up into relatively small courses (of approximately 80 hours duration) which allows students to build up their degree in manageable portions.

Although a bridging course is not available, it would be very easy and most appropriate to use the first course as such, with students having the opportunity to gain credit for the course on enrolment in the programme.

EXPERIENCES WITH THE NEW PROGRAMME

It is of considerable interest to ask whether the high hopes of the programme designed particularly to meet the needs of part-time students are being realised. After only one year of operation it is only possible to make brief comments.

Although students seem to enjoy the programme, some are experiencing difficulty in adjusting to the mode of study and to the disengagement of the programme from semesters.

Students generally are opting for the slowest possible progress rate which will make it impossible for them to complete the degree in the time allowed

(10 years). In order to encourage progress some 'advisory' deadlines have been introduced through the semester thus eroding the concept of self pacing.

The nature and purpose of the tutorials has not been clear but experience with some of the written material would indicate that the planned autonomy of this material has not been achieved. Further, it has been difficult to arrange tutorials to meet student demand and regular timetabled tutorials have introduced an element of pacing (Barham and Buckridge, 1983).

Some staff, used to contact programmes, expect students to attend and often do not themselves see the course as a whole, capable of being completed in one week of intensive study as envisaged by the designers. Thus the impression of a sequential development over several weeks is maintained as in a conventional course.

There is some evidence that some students have worked on courses over the summer period but that they postponed submitting their work for assessment until after the first tutorial to make sure they were on the right track.

Several years' monitoring of many aspects of the programme including the mode of learning, the adjustment by students to the mode, the use students make of the programme flexibility and the role of on-campus teaching will be required before it will be possible to say whether these principles for the design of a curriculum for part-time students described in this paper are in fact justified.

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CHAPTER 6

GRADUATES: AT THE PROFESSIONAL INTERFACE, AND IN HIGHER DEGREE STUDY.

It is accepted that the graduand entering a profession is not immediately capable of fully autonomous practice, but must undergo some further formal period of training and supervised practice. How useful are these periods of internship or induction? Dowsett describes the development of the pre-registration year for medical graduates and discusses the outcomes of a survey of interns at a large Sydney hospital - as with other forms of inhouse training, it is regrettable but not surprising that the service needs of the hospital appeared to take precedence over the learning needs of the interns. Within this general need for professional training after graduation Channon on the other hand describes a short informal inhouse training program for young lawyers.

What of students who go on to higher degree work? Nightingale gives a short overview of the development of higher degrees in Australia and claims in her paper that the nature and purpose of the PhD has remained largely unexamined since its inception in the 40's. While she argues for more coursework and alternative forms of the PhD, Magin claims that his study of PhD students at a large metropolitan university shows that they do not pursue a PhD for credentialist reasons and are not unhappy with the relevance of the research work.

THE INTERN OR PREREGISTRATION YEAR

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It is not uncommon for employers to complain of the time it takes for new graduates to become useful employees, or for the new graduates themselves to comment on the gaps they have discovered in their tertiary education after they enter the workforce. This paper seeks to explore briefly the reasons for this discrepancy between education, training and employment; to identify some possible solutions; and then to examine a particular strategy used in health education - that of the intern, or preregistration year.

One reason for this mismatch between academia and the "real world" may be that teaching staff are isolated in their "ivory towers" and out of touch with the current needs of the practising profession which they are supplying. Possible preventive measures include involvement of the practising profession in curriculum design or review, or as visiting teaching staff. Consultancy work, together with sabbatical or professional experience leave, can also help academic staff bridge the gap.

A problem can exist in courses where basic subjects are taught by academics from within those particular disciplines, since they may have difficulty in determining the level of knowledge required by graduates in that profession. It has been said that if universities taught young people to drive motor cars, the first year would be spent studying the chemistry of petroleum refining and the physics of the internal combustion engine, the second year would cover the rules of the road and the principles of third party and other insurance, and by the third year the student might be allowed to sit in the driver's seat.

Sometimes a student may not appreciate the relevance of the material offered, being unable to relate it to professional practice. This perceived lack of relevance may be reinforced by the inclusion of material in the course but not in the examination. In some courses these problems are addressed by including episodes of practical experience within the undergraduate course or during the vacation breaks between terms or semesters. Examples including engineering, social work, agriculture and physiotherapy. Practical experience may be offered to trainee teachers during their course or through a postgraduate diploma undertaken after acquiring a basic degree. Part-time courses offer another solution, particularly in business or commercial fields, since they allow studies to progress concurrently with practical experience in the work place.

A further solution is found in the concept of the intern or preregistration year undertaken by medical graduates. Each new graduate must be employed for twelve months, working under supervision, in a public hospital before full professional registration is granted. A similar requirement is found in physiotherapy. The concept is not unique to the health professions. Law graduates in New South Wales are required to undertake six months full-time practical legal training before entering into practice as solicitors.

However, much of this training is through simulation of the real-life situation.

How did the internship come about? Although penalties for professional incompetence or malpractice were in existence for professional groups such as architects, shipbuilders and surgeons as far back as 2000 BC, it was not until the sixth century BC in the Middle East that an attempt was made to restrict the practice of medicine to those who had already demonstrated competence. In the western world such a requirement is even more recent, dating from 1140 AD when the first European medical school was established at Salerno in Italy. A century later that same medical school introduced the need for graduates to practise under the direction of an experienced physician for one year before licensure.

Despite the initiatives displayed at Salerno, the concept of the preregistration year did not gain popularity. Medical training followed a dual pathway in Europe, either by apprenticeship or by university study, with competence being determined by examination.

It was not until some 600 years later that the concept of the preregistration year re-emerged in the United States. The term "intern" appears to have been first used in that country in 1865. By 1914, between 75 to 80 per cent of US medical graduates were undertaking internships, although only one state required this as a prerequisite for practice.

In Australia, medical education has largely followed the model of the United Kingdom. The aim of the undergraduate course was initially to graduate a safe general practitioner. Those who became specialists usually did so after a time spent in general practice. In the 1930s approximately half of the medical students qualifying in any year went straight into general practice, whilst the remainder held hospital posts for varying periods. Australia moved to make a preregistration year compulsory ahead of the United Kingdom, with provision being made for this in New South Wales in 1938. However, events related to the Second World War delayed its implementation until 1955. From that time all new graduates have been required to spend a period of at least twelve months of satisfactory service as a medical officer in one or more public hospitals.

The implications of the requirement for a compulsory preregistration year bear some consideration. Firstly, there must be sufficient positions to accommodate each graduate. This became a critical problem for medical graduates in 1979 when, as the result of a decision made in the early 1970s by the Universities of Sydney and New South Wales to reduce the length of the medical course from six to five years, a double graduation occurred. That year an additional 400 hospital posts were required for internships. It is also necessary to make provision for persons with physical disabilities if these preclude them from complying with the preregistration requirements.

The content of the preregistration year is defined only in the broadest terms as is the assessment of the individual doctor's performance. The Act requires "satisfactory service" during the twelve months, six of which being "satisfactory medical experience" and a like stipulation for surgery. Obstetrical experience may be counted as either surgical or medical. In the early days of internship the long hours worked - over 90 per week - and the variety of cases admitted to hospitals guaranteed exposure to a wide range of medical problems. More recently, the reduction of hours worked by interns since the introduction of a 40 hour week with overtime and the growth of specialty and sub specialty units supplanting general wards have diluted the experience gained in the twelve month period. It has also become common practice to exclude interns from paediatric and obstetric terms.

In order to analyse experience gained during the intern year in more depth, a survey was conducted at Westmead Hospital in 1982. Of the 34 interns employed at the hospital 30 completed a detailed questionnaire. The areas of experience surveyed included familiarity with acute problems, performance of practical procedures and knowledge of the management of common illnesses or injuries. The interns themselves were asked to rate their own competence and, in so doing, may have either over or under stated their ability. The survey confirmed there was considerable variation in the experience gained by individual interns.

Twenty-four acute problems were listed. Whilst everyone had encountered patients with chest pain some had not seen a case of asthma. Half were yet to assess a women with an ectopic pregnancy and only three had seen a sufferer from acute glaucoma.

Proficiency in performing practical procedures provides another check list against which one can measure experience gained. Thirty-four procedures were listed and again exposure to these were found to have varied widely. All had learned to use an ophthalmoscope to examine the eye as undergraduates. Proctoscopy - a simple examination which allowed the diagnosis of conditions such as piles or haemorrhoids - was familiar to some but a mystery to others. Catheterisation of the bladder was a skill acquired by all - largely because the hospital needed the procedure done. In most cases the opportunities to undertake these procedures existed but whether the individual gained this experience was determined by chance or because of the service demands of the hospital - not as part of a structured experience ensuring uniform and comprehensive exposure.

The duties of interns are usually divided into four or five terms of between ten to thirteen weeks working in different specialty wards and with different supervisors. Feedback regarding performance was only received in less than half of these terms. The interns themselves seemed to work on the theory that no news is good news since none sought feedback if it was not offered.

A wide range of postgraduate options is open to medical graduates and the intern year is important in terms of subsequent career choice. 54 per cent reported that their career choice altered during the intern year. However, only 34 per cent felt that sufficient information was available to help them arrive at this decision.

The intern year, despite its deficiencies, has been shielded from scrutiny as an entity because most medical graduates go on to further postgraduate training. Whilst its critics have listed what it does not achieve, little acknowledgement has been given to the changes which do occur. For the first time the new graduate must take on personal responsibility for patient care, while adapting to the demands of becoming an employee for the first time, perhaps in an unfamiliar hospital. The intern must also work with a team of health professionals although until now, he/she has competed as an individual for examination success. These could be seen as sufficient goals to be reached at the end of the intern year were it not for the fact that on its completion the young doctor is also now legally able to set up in private practice. For practical purposes this means private general practice since for those wishing to follow a specialist medical career a further period of some four to seven years supervised vocational training is mandatory. Many doctors voluntarily undertake a four year training period with the Royal Australian College of General Practitioners Family Medicine Programme. This provides specific vocational training for general practice. However, because of restricted funding from the Commonwealth government there are insufficient places in that programme to accommodate all applicants.

The problems that have been discussed are unlikely to be resolved in the short term. It has been proposed that the dilution of experience should be remedied by extending the period of the internship from one to two years. However, in the absence of a requirement for greater structuring of this experience the service demands of hospital staffing will continue to dictate the content of a second year. Such a requirement for structure could only be introduced by the New South Wales Medical Board and would be difficult to implement without additional expenditure from already over stretched hospital budgets.

NOTE

The questionnaire survey conducted in 1982 at Westmead Hospital formed part of a Project Report submitted in part fulfillment of the requirements for the Degree of Master of Health Personnel Education in The University of New South Wales.

A more detailed summary is available from the author.

PROFESSIONAL EDUCATION BEYOND GRADUATION: INTERVIEWING SKILLS FOR LAWYERS

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There are many flaws in the current system, or lack of system, of continuing education for university graduates in professional disciplines. Hunter (1984) describes the "episodic and haphazard educational events" which make up the formal educational input for the vast majority of professional graduates. He also underlines the lack of a clear responsibility for continuing education. Historically, professions have taken a certain responsibility for the continuing education of their members. Accrediting bodies such as the Bar Associations of the legal profession and the learned colleges of the medical profession often provide both formal course work and an examination system. The role of professional societies has traditionally included educational practices such as the organisation of conferences and seminars and the publication of journals (e.g. Lasagna, 1963). Even so, responsibility has in the main devolved on the individual, with most professional adult learners spending about 80-85% of their learning time in self-acquisition of knowledge (Tough, cited in Hunter, 1984).

More recently, especially in the case of the legal profession in the United States of America, employers have begun to take an active role in the continuing education of their professional employees (Henning and Passell, 1982; Henning, 1984). Many packages of teaching materials are available, developed by both private companies and the U.S. Bar Association.

The need for continuing professional education stems from many factors. Undergraduate professional courses may vary quite widely in content from one institution to another. Some courses may simply not cover areas which are needed in an individual's professional practice or they may give rather cursory coverage of an area in which an individual professional decides to specialise. Some areas may be taught at a time in the course when they have little perceived relevance to the undergraduate's future work and may be given scant attention for this reason. Other areas may be omitted because there is a lack of academic staff from other disciplines to teach them. For example many undergraduate courses in medicine, pharmacy, law, architecture and veterinary sciences have little information concerning the practical financial aspects of setting up and running a practice because teachers whose qualifications lie in business studies are not available to them. The fundamental philosophy of teaching varies from one institution to another and it is to be expected that contrasts, for example between the problem-solving case-centred approach as seen in Medicine at the University of Newcastle and in Law at the University of New South Wales and the more traditional "lecture-by-topics" approach of many universities will produce different skills and different deficiencies.

Finally, to a large extent the universities and colleges of advanced education perceive their role as that of educating undergraduates in the wider theoretical underpinnings rather than in the more practical aspects of a professional career.

For all these reasons, employers may find that graduates emerge from university deficient in some knowledge, skills and attitudes necessary for competent professional practice.

Most professions have a long history of on-the-job training. As far as the legal profession, the main focus of this paper, is concerned it is only five years since the system of articled clerks, a virtual legal apprenticeship system, has been entirely superceded in New South Wales. Newly graduated solicitors in this state now, instead of undertaking articles, spend a period of six months at the College of Law, which aims to teach the more practical aspects of lawyering and also runs continuing education seminars. In addition, some employers are now formalising aspects of their in-house training for new recruits especially in specialised topics relevant to the firm's practice.

A major advantage of in-house training is that it can attain a very fine focus on areas and issues relevant to the specialised interests of the participants and the particular firm's practice. This clear relation of the training programme to the day to day needs of the particular professional practice overcomes any questioning of the programme's relevance. The very fact that the employer is willing to give over paid working time to such a programme must also enhance the perceived value of the exercise.

On the debit side, several difficulties beset education in this area. The programme has to be intensive and short because the participants are being paid salaries and are involved in busy working lives. There are carefully documented and evaluated programmes available for teaching interviewing skills to lawyers (e.g. Goodpaster, 1975; Sherr & Sherr, 1980) but they are far too time consuming to be used in a commercial context. Teaching is often difficult to arrange from a logistical point of view because of busy schedules for all participants and the fact that most law firms are simply not set up for educational ventures. There are few pre-determined channels of communication between commercial law firms and tertiary educational establishments: unless informal social contacts exist it would be difficult to initiate a programme involving input from staff of a tertiary education institution. In a programme of the type outlined below a senior partner of the firm is involved in an active teaching role and for many lawyers, the role of teacher is not one they would actively choose. Not only does a programme of this kind demand a high level of co-operation between in-house legal personnel and external teachers, but it also brings with it the possibility of high levels of performance anxiety on the part of the learners who are being observed by those responsible at least in part for their promotion prospects. It must be stressed that the training experience is meant to be a learning exercise and is certainly not an assessment of the participant's ability, to be considered in the context of promotion.

THE PROGRAMME

A significant aspect of legal practice involves interviewing clients and conducting meetings. Especially at the initial interview the client may well be highly anxious about his case and a centrally important need is to develop a good rapport where worries and concerns may be aired by the client (Freeman & Weihafen, 1972; Rosser, 1980). The lawyer must provide a setting in which he can obtain sufficient facts about the situation to analyse the legal merit of his client's position and the potential risks and benefits of any action, communicate choices of action to his client and, for senior professionals, arrange financial and other practical aspects of the relationship. For some lawyers, especially those working in litigation, there will also be the need to interview witnesses, a proportion of whom will be reluctant to disclose information.

Studies have shown that medical students in the clinical years are deficient in their ability to collect information by interviewing patients (Maguire and Rutter, 1978; Sanson-Fisher and Maguire, 1980; Batenburg and Gerritsma, 1983). Assessment of initial interviews carried out by a group of English articled clerks similarly showed that they performed badly. They collected little relevant information and gave poor legal advice (Sherr and Sherr, 1980b).

The firm which initiated the current programme is a large city firm employing over 100 solicitors. The practice is mainly concerned with large-scale commercial law work. Young solicitors who had been with the firm for less than one year and who were employed in the litigation section of the firm took part in the current study. The firm plans to expand the pilot scheme to involve new legal staff in other sections.

The sessions were conducted with from 4 to 6 solicitors. The group facilitators comprised a partner from the firm and the author, who teaches interviewing skills to medical students as part of her work at the University of Sydney.

Initially a plenary discussion concerning the aims of the initial interview with a client were discussed in a non-directive style. Then a role play of an initial interview (Note A) took place with the procedure being recorded on videotape. The trainee who conducted the interview was not privy to the role play description. The participants were then asked how they felt that the interview had proceeded, with the interviewer allowed to comment first before the rest of the group had a chance to be critical. Both group facilitators offered comments in general terms and then the videotape was replayed. Any group member was allowed to stop the tape to comment or inquire about techniques of interview skill and legal practice.

The second part of the session mirrored the first to some extent. Participants were asked to list and discuss any additional problems which might be encouraged when interviewing witnesses. They then carried out a role play (Note B) with replay and comment from facilitators and group members.

Evaluation

The evaluation pro-forma was very open-ended. Participants were asked to note what was good about the sessions, what bad and invited to give any further comments. Bad features largely related to time constraints. Several participants would have liked more than one session so that everyone could take a turn at interviewing. A possibly salient comment concerned the fact that in practice a lawyer rarely interviews a client with no information about the nature of the problem. Participants suggested that scripts should give more background information and also people should have some little time to research the problem before interviewing the client. (This suggestion is possibly symptomatic of the fact that, in spite of every effort to remove it as far as possible, performance anxiety is a problem and participants are keen to show up well when observed by senior personnel. Consultation with partners in the firm revealed that the majority of clients gave very little information about the legal difficulties they were experiencing prior to the initial interview.) Good points noted included the opportunity to have comments on both legal and psychological aspects of interviewing, the use of small groups, the increased awareness of interactive style and the opportunity to see oneself in action on video. The tenor of comments in general was very positive.

Future Developments

The major aim here is to evolve a programme which retains as far as possible the benefits of the current exercise but which is less time-consuming for teachers. An experimental programme of written notes and a videotape demonstration combined with the availability of a video-recorder for use in role plays without the presence of facilitators has been suggested. The fact that commercially produced video packages are available is an immediate advantage here. Such a programme would, however, leave out the most consistently appreciated feature of the current programme, namely comment on the actual interview which took place by a psychologist and by a senior partner well-versed both in law in general and the specific policies and practices of the firm in question. The two approaches will be systematically contrasted to assess their relative effectiveness in terms of cost-benefit considerations.

NOTE A:

Interview Role Play

You are the state manager for a finance company (age 44 - married with 2 children). A year ago when your company was flush with funds you approved a lease to a small peanut growing business in Queensland of a peanut super harvester worth $700,000. The business has now failed. You believe that the farmer had no personal assets (information supplied by local agent) but that the family wealth is in his wife's name. Because of an oversight you obtained a personal guarantee from the farmer but did not obtain one from his wife.

(Lawyer)

Your firm acts for a finance company. One of the state managers rang in an agitated state and insisted on an immediate consultation. You would have preferred to collect background information, but agreed to meet with the manager bacause of his/her obviously disturbed state.

NOTE B:

Witness - Interview

You are the data processing manager of a large department store. One of the computer operators apparently had found a method of surcharging every account by $1. He has now left for an overseas destination believed by the Commonwealth Police to be either Bolivia or Tasmania. You have been asked to give a statement about the systems in operation and the way in which the thefts could have occurred. You are a little worried because you were required to work back a few times alongside the operator in question and those evenings tended to finish with drinks, dinner and etc. Most likely no-one noticed, you hope.

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THE EDUCATION, TRAINING AND EMPLOYMENT OF POSTGRADUATES

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A CTEC-funded Evaluative Study of Postgraduate teaching and research supervision was conducted at Macquarie University in 1983 and early 1984. A number of questions related to the objectives and outcomes of instruction at this level were raised by academic staff and students in responses to the Evaluative Study Working Party. These issues have been discussed many times in the past (by the Murray, Martin and Williams Committees, for instance), and no doubt, will be aired at regular intervals in the future. They asked, for instance, whether research students' experiences were the best preparation for the employment they would seek, whether some coursework programs were too limited in their offerings, and whether students had difficulty in obtaining appropriate employment after higher degree study.

In the best of all possible worlds the objectives of postgraduate study would be clearly stated; shared by academics, students, and the community; and met by the programs being offered. But the best of all possible worlds must be much less complex than the real world in which any university exists. The reality is that universities serve a number of masters and they do not necessarily agree on the goals of higher degree study. For instance, in some professional programs the curriculum takes account of the requirements of outside bodies which "license" students to practise in their profession; students desire greater flexibility, a wider range of courses from which to choose a program, and more relevance in a changing society; academia traditionally emphasises research which may become rather esoteric in the eyes of practitioners. And finally, although the University is nominally autonomous, in practice university autonomy is limited by dependence on the Commonwealth government for recurrent and capital expenses.

SUMMARY OF TRENDS IN AUSTRALIAN POSTGRADUATE EDUCATION

Over the past 25 years, postgraduate study in Australia has become highly diversified, preparing students for varied roles in the community. The most basic distinction is between postgraduate coursework study and postgraduate research study. Coursework programs may be designed to provide professional qualifications (such as those leading to membership in the Institute of Chartered Accountants), to provide a combination of advanced study and clinical experience (e.g. a Diploma or Masters program in audiology, or a Masters program in clinical psychology), to extend students' knowledge in the area of their undergraduate study, or to enable students to enter new fields of study. Some programs have distinctly career-oriented goals, others have broad liberal objectives. Postgraduate research programs have general goals related to initiating students into the world of scholarly research, and they have specific goals related to the projects proposed by students.

Reports submitted to the Australian Government since 1957 discuss the objectives of education in general, but rarely do they consider the specific objectives of postgraduate education. Nevertheless, they provide a chronicle of the development and trends in postgraduate education over nearly three decades in Australia.

In 1957, the Committee on Australian Universities (the Murray Committee) reported as Australia entered a period of rapid economic growth and expansion in all sectors. The optimism of the times produced idealistic statements of the goals of universities: "to offer a full and true education, befitting a free man and the citizen of a free country" (p.8); to conduct research which was indispensable to the welfare of the nation; and to "be the guardians of intellectual standards, and intellectual integrity in the community" (p.11). University research was characterised as being undertaken without regard to applications and for the advancement of knowledge. Concerned for the weakness of honours and postgraduate study in Australia, the Committee urged an increase in the numbers of graduates.

Seven years later the Martin Committee reported on the Future of Tertiary Education in Australia. That Committee put more emphasis on the expansion of post-secondary opportunities in technical areas and teachers colleges, but there was still a need to encourage higher degree study. The general goals of education were still expressed in broad, liberal terms, but the report stressed economic benefits. The Martin Committee report noted that with the rapid expansion of knowledge in almost all areas of study, undergraduate courses were in danger of becoming overloaded and overspecialised, denying students the benefit of broader programs of liberal education. Postgraduate study should extend students' understanding of the nature of their subject. Consequently, the report advocated more formal coursework for research students.

By 1972, there were reports of PhD graduates having difficulty finding employment (Universities Commission Fifth Report). Coursework programs with more specific vocational goals were considered likely to attract students who might earlier have undertaken research programs. The trends to reduced rate of growth of higher degree research numbers and increasing growth in postgraduate coursework enrolments continued and were reported again by the Universities Commission in 1975. The Commission wished to encourage university research but did not seek to increase the rate of growth of postgraduate research enrolments. Again the emphasis was on the employment prospects of graduates and the greater market value of some of the coursework qualifications compared to research degrees.

When the Williams Committee of Inquiry into Education and Training reported in 1979, the reduction in real resources for research and the slow rate of growth in postgraduate research were cause for concern. The Committee encouraged expansion of postgraduate research but noted that students should expect to enter careers outside the universities, and suggested that "universities should review their post-graduate programs in the light of this change in the employment opportunities for their post-graduate students. There is evidence that very highly specialised PhD programs do not always provide the most useful and stimulating training for students in applied research or for problem-solving in complex situations." (p.209)

SWANN RECOMMENDATIONS FOR ACHIEVING GREATER RELEVANCE IN POSTGRADUATE EDUCATION

Statements stressing the need to reconsider the relevance of postgraduate research and recommendations for the inclusion of more coursework and for reappraisal of the type of research which is expected of students have appeared at regular intervals through the whole period under review. The Swann report (UK, 1968) covered "The Flow into Employment of Scientists, Engineers and Technologists"; its recommendations were quoted with approval in a 1974 report by the Science and Industry Forum of the Australian Academy of Science.

(a) There should be a change of emphasis towards shorter periods of postgraduate study more closely matched to the needs of employment; the move from research to selected course work should be accelerated.

(b) More attention should be given to education and training throughout the career and after experience of employment. Post-experience students, whether on courses lasting a year or very much less, should form a rapidly rising proportion of the total postgraduate population. More flexible course arrangements should be developed to make it easier for mature persons to participate.

(c) The content of postgraduate education and training should be reviewed in the light of the requirements of industry and the schools. This is already taking place but we believe it must happen more quickly.

(d) In particular, the universities should examine the nature and purpose of the PhD degree from first principles, and consider drastic action to bring within its scope other forms of postgraduate training more closely orientated to the requirements of industry. The aims of the PhD, and the implications of possible changes for science and technology and for qualified manpower need to be considered. The time is long overdue for the universities to start experimenting boldly with the PhD and with the regulations which govern the award of this degree.

(e) Industry should be intimately involved in the planning and conduct of postgraduate education and training which is intended to meet its requirements.

These recommendations seem worth considering once again. The Macquarie University Postgraduate Evaluative Study concluded that a) and b) have substantially been met at that institution. Data in the CTEC report for the 1982-1984 triennium show that although Macquarie University now has the largest proportional commitment to postgraduate coursework of all Australian universities, it has not been alone in increasing its coursework offerings, many of which have specific vocational objectives. Many coursework programs schedule evening classes or are offered as external courses and accept part-time enrolments to enable mature-age persons to participate. Many programs are specifically aimed at people who are employed in related areas (for example, Management and Counselling).

Data at Macquarie suggest an acceptable level of student satisfaction with coursework and good rates of progress for students who complete programs, with mean time to completion being within limits set by the Schools of the University. Close to 90% of Master's and postgraduate Diploma candidates are enrolled part-time; their withdrawal rates are just under 40% with the highest rate of discontinuance being among humanities students (46%). Students in economics and finance programs progress most rapidly. Such data imply that students with career goals and specific employment prospects are most likely to "succeed" (if we equate success with completion in near-minimum time).

EXAMINE NATURE AND PURPOSE OF PH.D.

While significant development of coursework has occurred, recommendations c), d), and e) have not been fulfilled despite repeated similar appeals in higher education journals, university committees, and other public fora as well as in the government documents already cited. And particularly the recommendation to examine the nature and purpose of the PhD degree from first principles has been largely ignored. There are isolated cases, such as the development of PhD programs in clinical psychology, where PhD programs have departed from the research mode typical of Australian PhD study, but on the whole, students here receive their PhD for completing a substantial thesis and undertake little or no coursework and attend few if any seminars. The Evaluative Study at Macquarie encouraged the University to take up recommendations c), d), and e), but reading them to apply to all areas of study at Macquarie, not just the sciences. It is past time that serious thought be given to the objectives of all postgraduate programs but particularly to research programs.

While student satisfaction with research supervision is quite high at Macquarie, it is disturbing that only 46% of full-time PhD students have submitted a thesis six years after enrolment. Data comparing part-time PhD students to full-timers at Macquarie show a higher percentage of part-timers receiving their degree within six years, a lower percentage discontinuing, and similar rates of progress with part-timers only slightly slower than full-timers. (These figures were prepared to compare with data presented by Barrett and Magin at AARE in 1983. The cohort of students studied enrolled in 1974 and 1975 and their status as of June 1980 was the basis for analysis. There is less difference between part-time and full-time PhD students if withdrawal rates etc. of all students ever enrolled are calculated.) Research students in economics and finance at Macquarie are much less likely to complete programs than students in coursework in the same field; 44% of PhDs discontinue - an even higher percentage than in humanities which is usually considered the most risky area of study (in this regard).

As far back as 1964, the Martin report advocated increased coursework and/or seminar attendance for research students. It is not only in the sciences that the body of material to be studied by undergraduates is expanding. To take one example from the humanities, students of literature in Australia are no longer expected to know only major English works and something about the development of the language; they should also be acquainted with Australian writers, and American, and at least show some awareness of the New Literatures in English. And it would be an impoverished student of literature who studied no history, and what of some philosophy, etc, etc? It seems self-evident that postgraduate programs must assume some gaps in the preparation of incoming students and that setting to work on a necessarily limited project is not likely to fill those gaps. Macquarie's Evaluative Study recommended reconsideration of the content of postgraduate research education and the inclusion of advanced and substantive coursework. Not only should increased coursework allow students to broaden their understanding of their areas of specialisation but also it should increase student contact with the community of scholars, thus reducing the sense of intellectual isolation often portrayed as the curse of research study in areas other than laboratory-based sciences. Logically, increased coursework should mean somewhat decreased quantitative expectations of the thesis component of students' work. The massive tomes often submitted suggest that this would be highly desirable.

A related recommendation is that at least in some areas of study it may be appropriate for PhD students to be allowed to submit a collection of papers, published or in manuscript, rather than the traditional extended thesis. Discussion of ways of implementing such a recommendation are beyond the scope of this paper, but some of the argument in its favour is apposite. Whether students are destined for academic, research, government or industrial careers, professional advancement commonly will depend on an ability to write journal-style articles or internal reports. Theses seem to be becoming ever more expansive, and examiners frequently comment on overly long and repetitious presentations which seem never to reach a clear conclusion or state a definite philosophical stance. (Nightingale, 1984) It would seem that if students could offer papers on related topics within an area instead of one extended dissertation, they could not only cover a broader range within their subject areas but also develop some of the skills of selection and editing that will be of service to them in employment.

CONSIDER EMPLOYMENT PROSPECTS OF POSTGRADUATES

With so much of the discussion of postgraduate programs revolving around employment and labour market planning, it is hardly surprising that there has been some worry that "credentialism" has reared its ugly head and that students are scrambling for an extra piece of paper, any extra piece of paper to give them an edge in the job market. The Williams Committee devoted a chapter to discussion of credentialism and clarified many of the issues while doubting "whether 'credentialism' is a notion capable of analysis and measurement". (p.466) Without rehearsing all of their arguments, it does seem important to remind planners that it is possible that a higher level of training or education may not be necessary in all areas. It is possible that more qualifications may not lead to greater job satisfaction; if the job does not require the higher level of knowledge, the worker may be more frustrated than fulfilled. Public opinion is a powerful force: some professions may seek to increase their status by raising requirements for participation in the profession; parents and students can also pressure universities to offer extended programs of study; academics and others who train and educate students may also unthinkingly assume that more is better. The trend has been for education to be extended; it is worth taking time to ask whether further extension is really justified in each specific case. And if the answer is 'yes', it is worth giving time to another complex question: when we prepare people as practitioners, should we strive for initial job competence, or should we aim to build a broad base of principles for long-term growth and understanding?

A report submitted to the Vice-Chancellor of ANU in 1978 makes a number of recommendations about improving career counselling for higher degree students. (see pp.12-15) The ANU Working Party did not believe that detailed manpower planning techniques could be applied with enough precision to make decisions

Table I: Employment status of persons who qualified for an award in the year ending 31 May 1983: by program qualified

Employment Status	Degree/Diploma for which qualified				
	Graduate Diploma	Masters Coursework	Masters Research	Doctorate	Total
Full-time work	33	112	17	25	187
first full-time position	5	19	4	3	31
not first full-time position	28	93	13	22	156
Part-time work	2	6	4	-	12
seeking full-time work	1	-	1	-	2
not seeking full-time work	1	6	3	-	10
Not working	5	4	4	1	14
seeking only full-time work	1	-	-	1	2
seeking only part-time work	1	2	-	-	3
seeking either part or full-time work	-	-	1	-	1
not seeking work	3	2	3	-	8
No response	14	43	12	5	74
TOTAL	54	165	37	31	287

Note: 29 of the respondents are undertaking further study, 19 of them at Macquarie.

Source: Macquarie University Statistics 1984.

about intakes and programs for higher degree students, but they emphasised the need for increased awareness on the part of students and academic staff of employment opportunities and alternative career paths in fields of interest. The Working Party at Macquarie has endorsed their findings.

However, it has brought certain University statistics to attention. Table I shows the employment status of persons who qualified for a higher degree or diploma in the year ending 31 May 1983. Of the 287 persons who qualified for an award, 74% provided information on their employment status a few months later. Of these, 88% were in full-time employment. Only 14 persons were not working at all and 12 were in part-time employment. Of these 26, only 4 were seeking full-time work; 3 were seeking only part-time work; 1 was seeking either full-time or part-time work; the remaining 18 were not trying to change their status.

For those who have been concerned about the employment prospects of newly graduated PhD students, both Macquarie statistics and a study conducted at Melbourne University should be reassuring. Of the 31 persons who qualified for a doctorate at Macquarie in the year ending 31 May 1983, 25 found full-time employment, only 1 was seeking full-time employment, and 5 failed to respond. Harman's study at Melbourne shows that in 1983 the full-time employment rate for 1982 graduates was 93%.

We also know something of the destination of these students. The Melbourne study shows that in 1983, 51% of 1982 PhD graduates were employed by universities, 2% by colleges of advanced education, 19% by government departments, 19% in fields such as journalism and geology, and 9% by research organisations. Macquarie University statistics show the type of work undertaken by recipients of higher degrees or postgraduate diplomas. Table II breaks down the group in full-time employment by sex and by the School of the University in which the student qualified. Of course, the data reflect the nature of Macquarie's postgraduate programs as much as the community's demand for postgraduates, but it is interesting to note the number of former students who are employed in research or research-related occupations (like environmental planning) and in teaching, particularly at tertiary level. And this is despite the fact that these data include graduates of vocationally oriented coursework Master's programs and diploma courses.

Although it does not seem that graduates are having great difficulty finding full-time employment, it is important for policy-makers, curriculum-planners, and advisers of individual students to be mindful of the possible difficulties faced by some graduates. There is enough anecdotal evidence to be wary of assuming there is a pot of gold at the end of every higher degree rainbow. It is just possible that a research degree in particular may be more of a handicap in a few cases than an advantage. Members of the School of Earth Sciences at Macquarie are quite positive that industry prefers a good Honours degree to a PhD and some recent graduates believe that private secondary schools show little interest in PhDs. The failure of the NSW Department of Education to reward teachers for undertaking advanced study is well-known. More evidence about the attitudes of potential employers would be very useful but it is hard to come by. Nevertheless, the destinations of graduates do seem to suggest that industry and the schools are not benefitting to a great extent from the services of these highly qualified, and presumably talented people. We must ask ourselves why not? Probably successful research postgraduates themselves seek employment primarily in the traditional areas of research and tertiary teaching. After several years of academic research, such careers have the appeal of familiarity as well as their other charms (such as study leave and flexible hours). But it is possible that a slightly

Table II: Persons in full-time employment who qualified for a higher degree or postgraduate diploma in the year ending 31 May 1983: type of work by School in which qualified by sex

	School and Sex																								
	Behav Science		Biolog Science		Chemistry		Earth Science		Econ & Finan.St		Education		English & Ling		Hist, Phil,Pol		Maths & Physics		Modern Langs		Env & Urban St.		Total		
Type of Work	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	P
Clerical, Administration									4		1				1								6		6
Scientific research, Technical design and drafting	1		3	1	1		1		6			1						1			2	1	14	4	18
Routine scientific, Technical laboratory work					1				1												1		3		3
Production, Maintenance					1		1		2														4		4
Technical Services, Extension work							1																1		1
Environmental and/or resources planning and control			2				5	2	2												5	1	14	3	17
Medical, Dental, Paramedical, Veterinary	1	2												4									1	6	7
Psychology, Personnel, Social welfare, Child care	3	9																				1	3	10	13
Sales, Marketing, Purchasing							1		7														8		8
Computer programming, Operations and/or systems analysis									3	2											1		4	2	6
Corporate planning, General management					1		3		13	1													17	1	18
Other management services									1														1		1
Accounting, Auditing									4	2													4	2	6
Other financial									6	1											1		7	1	8
Actuarial									1														1		1
Legal									2														2		2
Non-technological research, information and/or advisory		2	1				1																2	2	4
Library, Archives										1														1	1
Other literary, creative, entertainment																					1		1		1
Protective services, Church															2								2		2
Teaching - primary, sub-primary											1	2		1									1	3	4
secondary					2		1				5	2	1	1	2	2						1	11	6	17
special											1	1											1	1	2
technical and further											1												1		1
tertiary	3	3	1		1		2		1		10	4	1	1			1				2		22	8	30
Educational administration		1				1		1			1												1	3	4
Other (n.e.i.)															1								1		1
No response							1																1		1
TOTAL	8	17	7	1	7	1	17	3	53	7	20	10	2	7	6	2	1	1			13	4	134	53	187

Source: Macquarie University. Statistics 1984.

different type of advanced study (though primarily research study) would help open students' minds to other possibilities. Again we must reiterate the possibility that the traditional British-style PhD by research is too narrow, that at least some coursework to add depth to undergraduate coverage of subjects would provide better preparation for careers outside academia. Indeed, there have been many demands for such preparation for students with academic aspirations as well. Using figures from the Melbourne study, 50% of PhD graduates will take academic positions as teacher/researchers. Their qualification has given them training in research but no training as teachers and (with reductions in part-time tutoring and tutorships) very little experience.

Furthermore, although so much of the discussion of postgraduate study over the years has focussed on employment prospects and the needs of education, industry and the public service for graduates, there are other considerations in making plans for the university. Those broad liberal objectives of higher education, which are passed over in a few sentences of government reports or university proposals for new courses while decisions are based on economic considerations, are important in any society. As the next section of this report will highlight, they are also important to students who rate "personal satisfaction from an improvement in general education" as one of the most important factors in their decision to undertake postgraduate study.

Table III: Perceived importance of factors in deciding to undertake postgraduate study

		n = 734		
		% of respondents rating the factor as -		
		Not very important	Somewhat important	Very important
1.	Aspire to academic career	62	22	15
2.	Improvement of career prospects	18	32	50
3.	Development of research skills for my current profession	43	31	26
4.	Extension of knowledge for my current profession	21	26	54
5.	Personal satisfaction from an improvement in general education	14	36	49
6.	Change of career or field of interest	57	23	20
7.	Limited employment opportunities	70	18	12
8.	Encouragement of family, friends, colleagues	70	23	8
9.	A natural progression through the education system	66	26	7
10.	Need for a professional credential (e.g. Inst. of Chartered Accountants)	72	15	13
11.	Personal satisfaction at being in academic environment	38	37	24

CONSIDER STUDENTS' REASONS FOR UNDERTAKING POSTGRADUATE STUDY

In conducting the Evaluative Study at Macquarie, we surveyed all currently enrolled students in 1983. One question of relevance to the discussion of the education and training needs of postgraduates related to their reasons for undertaking postgraduate study. Table III shows respondents' ratings of eleven factors which might influence students' decisions to enrol in postgraduate study.

Of the eleven factors listed on the questionnaire circulated to currently enrolled students, the three factors rated by Macquarie students who responded to the survey as most important in the decision to undertake postgraduate study were:

1) Personal satisfaction from an improvement in general education
2) Extension of knowledge for my current profession
3) Improvement of career prospects

The factors rated as least important were:

1) Encouragement of family, friends, colleagues
2) A natural progression through the education system
3) Limited employment opportunities
4) Need for a professional credential

However, some factors proved to be more important to one subgroup of the respondents than to another. Reasons for beginning advanced study were cross-tabulated with the nature of study (research or coursework), sex, age, and the area of study (Economics, Education, Humanities, Sciences, and Social Sciences). Table IV identifies those categories of students between which there was a significant difference ($p<.01$) in the importance of the various factors listed in the questionnaire. A "+" indicates the subgroup which rated a factor "very important" significantly more often than the subgroup indicated by a "-". The designation "0" is used to identify subgroups whose ratings of the importance of a factor were neither as high as the first group nor as low as the second. No mark at all indicates that there was no significant difference between subgroups' ratings of the particular factor under consideration.

Considering only the three most important factors in making the decision to undertake a higher degree program, which variables were associated with attitudes? Nature of study, research or coursework, is not an influence on the rating of any of the three factors. Sex is an influence on all three with "personal satisfaction from an improvement in general education" being more important to females, and the two factors associated with careers being more important to males. "Extension of knowledge for my current profession" and "Improvement of career prospects" were more important to younger students, but age did not influence the rating of "personal satisfaction...". Nor was the rating of that factor influenced by area of study. "Extension of knowledge for my current profession" was important to all areas of study except humanities. "Improvement of career prospects" was significantly more important ($p<.01$) to students in the economics areas and less important to humanities students.

The Tertiary Education Research Centre at the University of New South Wales surveyed postgraduate research students enrolled at that university in 1982. Despite the fact that the Macquarie survey included coursework Masters and Diploma students, the results of questions about motivation were very similar at the two universities. At UNSW also, personal satisfaction was the most important factor in undertaking postgraduate study, followed by the useful-

Table IV: Reasons for enrolling in postgraduate program: Importance of factors to subgroups of the respondents

	Nature of study		Sex		Age		Area of study				
	Res	Course	Male	Female	Younger	Older	Econ	Educ	Hum	Sci	SocSci
Aspire to academic career	+	-	-	+			-	+	0	0	0
Improvement of career prospects			+	-	+	-	+	0	-	0	0
Development of research skills, current profession	+	-			+	-	-	0	-	+	0
Extension of knowledge, current profession			+	-	+	-	+	+	-	+	+
Personal satisfaction, improve gen'l education			-	+							
Change of career or field of interest	-	+					+	-	-	-	+
Limited employment opportunities					+	-	0	-	-	0	+
Encouragement of others	+	-									
Natural progression in my education	+	-			+	-	-	+	0	0	0
Need professional credential					+	-	0	0	-	0	+
Personal satisfaction at being in academic environment			-	+			-	+	+	0	+

+ factor more important to this subgroup

- factor less important to this subgroup

0 factor of moderate importance to this subgroup

ness of the research skills and knowledge gained, and by the usefulness of the qualification to career prospects. The least important factor to UNSW research students was that opportunities for suitable employment were limited, followed by the opportunity the qualification would provide for a career change. This last item was a little more important to Macquarie students; nearly 10% more of them rated it as very important. This does not seem surprising since slightly over 60% of the Macquarie respondents were coursework students. It is also interesting that neither survey discovered many students with academic aspirations. Only 10% of PhD students and 6% of Master's students at UNSW listed this as their first reason for undertaking higher degree study, and only 15% of Macquarie students rated it as very important. Academic aspirations were, of course, more important to research students than to coursework students. But they were also more important to females than to males, and to students in Education than to those in other areas, particularly Economics. Since so many of the objectives of postgraduate research programs seem to be based on the assumption that students will remain in academia, some serious thought should be given to the changed aspirations and prospects of students undertaking research programs.

CONCLUSION

While in three decades postgraduate study in Australia has undergone a period of rapid development, seeing the very first PhDs awarded, the implementation of enormously varied coursework programs, and a number of shifts in the emphasis placed on research and coursework, it is vital that all institutions involved in the delivery of postgraduate education continue to review the needs of students, the community in general, and specific professions and academic disciplines. Thoughtful and creative initiatives will always be necessary to meet changing demands and interests.

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HOW USEFUL IS PH.D. TRAINING?: THE VIEWS OF DOCTORAL CANDIDATES AT THE UNIVERSITY OF NEW SOUTH WALES

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In the immediate postwar period Ph.D. programmes became established in most of the then existing Australian universities. In the 60's enrolments in doctoral programmes grew rapidly, although during that decade of rapid growth the production rate of Ph.D. graduates was insufficient to meet the recruitment needs of an expanding demand for academic and scientific research personnel. In the 70's this situation reversed, and for some time now we have come to expect that only a small proportion of Ph.D. graduates will subsequently enter academic posts or gain entry to research institutions.

The recognition of this dramatic change in supply and demand-by no means peculiar to Australia- has led to an increased concern about the future direction of higher degree provisions and structures. The debate over the purpose and structure of doctoral study is of course not new: for example,Rudd(1975) instanced William James' trenchant criticism (written in 1903) of the expansion of doctoral studies in America; and also referred to the arguments advanced by the University of London in 1918 opposing the introduction of the Ph.D. because of its 'similarity to the London master's degree'.

The current situation has however given rise to what many see as a dilemma: most of our doctoral graduates will enter the workforce in posts other than those available in academia or government research institutions. For these students doctoral study provisions and the specialist research skills embodied in degree work are therefore likely to be regarded as not suited to their professional employment needs. Yet the Ph.D. degree in Australia has been regarded since its inception as providing for the development of an 'independent scholar', and as a mechanism for ensuring academic reproduction. According to Hill, Fensham & Howden (1974), "In beginning research studies for the PhD these universities clearly had in mind the need to provide within themselves the training that would formally equip persons to become university staff in Australia"(p.14).

The recognition that most Ph.D. graduates would not be able to establish careers in universities or government research institutions has led to efforts to determine ways in which the pattern of Ph.D. provisions could be changed, or at least be made more flexible, to better accommodate the career and skill needs of the majority of doctoral candidates(e.g. Armstrong et al, 1966; Whitton, 1969; Davies, 1972; Hill et al, 1974; Stranks, 1979).

Although a number of recent changes in doctoral provisions to allow greater flexibility have occurred in recent years in several Australian universities, the basic pattern of Ph.D. study, incorporating study through individual investigation of a specialised topic under supervision by a member of a university department, remains very much the norm. Even though arguments for change, with supporting studies, had been put forward as early as the mid-60's, the resistance to change had been anticipated: "We think that it will require a minor revolution in postgraduate schools before adventurous flexibility is accepted as a necessity or even a virtue "(Armstrong et al, 1966).

This resistance is not seen as implying that a problem was not acknowledged to exist, or that actions should not be undertaken to improve the 'fit' between the nature of the Ph.D. training provided and the interests and career aspirations of candidates: rather it is seen as embodying the view that the situation requires a re-assertion and restatement of the traditional purposes of the Ph.D. - a commitment to scholarship and the advancement of knowledge- and that actions should be taken to ensure that the candidature is more suited to this essential purpose. An expression of this view can be seen in the following quotation:

> If objectives at the undergraduate level in universities are ill-defined, objectives at the postgraduate level are rarely defined at all. In the past the situation was simpler for then, at least, student and staff views of objectives were probably more congruent than are they now. At present, I suggest, there is considerable discrepancy between the two viewpoints. Thus, for students, higher degrees are rapidly becoming a *sine qua non* without which they know the higher echelons of science(to name a familiar area) are not attainable, as in the C.S.I.R.O. Scholarship may have no place in the holding of this view, and few students look beyond this fundamental fact of life. The M.Sc., Ph.D., and Honours degree have become what the B.Sc. was but a few years ago: a convenient label to separate the herd from the rest.
>
> The viewpoint of many staff members on the other hand still retains considable overtones of idealism. Many staff seem to behave as if the picture is not greatly different from what it appeared to be at the time they obtained their own degree, viz. the objective should be research pursued for its own merit- all postgraduates should be dedicated scholars interested in fundamental research (and for whom future employment outside their immediate speciality is a fate to be avoided). Neither viewpoint is one which can be regarded as reasonable. The student viewpoint in effect prostitutes the inner core of the university, its research and scholarship; the staff viewpoint needs greater congruency with reality.
>
> (Williams, 1971, pp.1-2)

Although Williams may have exaggerated these typical viewpoints to give emphasis to the urgency of the problem, the view that many doctoral students are pursuing their studies without developing a commitment to research scholarship and the advancement of knowledge in the discipline is one which has a long history in the literature on doctoral studies. This form of criticism of the motives and aspirations of doctoral students has been referred to as 'credentialism'- the valuing of the degree solely in terms of its cachet value, and the consequent devaluing of scholarship and the skills embodied in the process.

'Credentialism'

Concern with the notion that students engage in doctoral studies for reasons other than a commitment to scholarship has early origins: in William James' article titled 'The PhD Octopus'(1903) it was argued " The truth is that the Doctor-Monopoly in teaching, which is becoming so rooted an American custom, can show no serious grounds whatsoever for itself in reason... In reality it is but a sham, a bauble, a dodge, whereby to decorate the catalogues of schools and colleges".(Quoted in Rudd, 1975). Further, as Rudd points out, the 1912 Congress of the Universities of the British Empire resulted in a decision to defer introduction of the Ph.D. principally on the grounds that the possibility of a doctorate would draw into research people who were attracted not by research but by the degree, and that the doctorate would be devalued (Rudd, 1975, p.12).

These views from the past, whether percipient or reactionary, were however to have ramifications in the expansionary decade of the 60's. Clark Kerr in the 'Uses of the University' expressed alarm at the direction of higher degree study and the scramble to obtain Ph.D. qualifications, and advocated the need to strengthen the university's commitment to traditional values of scholarship and excellence:

> The university has been embraced and led down the garden path by its environmental suitors; it has been so attractive and accommodating; who could resist it, in turn, want to resist?...The university may now again need to find out whether it has a brain as well as a body.
>
> (Kerr, 1963, p.122)

'Usefulness'

Are these apprehensions about the 'credentialist' outlook of Ph.D. students well-founded? Is it reasonable to typify these students as lacking in their commitment to scholarship and research? Do they see the doctoral experience as serving only a certifying function in which the training provided and the skills developed are discounted as being of no use to productive professional work?

These would appear to be empirical questions best directed towards the students themselves. In the present study information from 420 students enrolled (in 1982) in Ph.D. study at the University of New South Wales is presented with respect to three questions:

(i) Why did the students undertake doctoral study?

(ii) What importance is attached to the attainment of the doctoral degree with respect to gaining career entry or advancement?

(iii) What value is attached to the skills being developed and knowledge gained with respect to current or future professional work demands?

RESULTS OF THE STUDY

The 1982 Survey

Full details of the sample, questionnaire and survey method are contained in an earlier publication (Barrett, Magin & Smith, 1983). Briefly, the 1982 survey consisted of a questionnaire sent to all students then enrolled in Ph.D. or Research Masters degrees. Of the 698 students enrolled in Ph.D. studies, completed questionnaires were received from 420 students, providing a response rate of 60%. Most of the respondents (65%) were from engineering or the sciences - a similar proportion to that which exists in the population as a whole. Most of the doctoral students were enrolled full-time (56%), and 78% were male.

Reasons for undertaking doctoral study

At question 16 of the survey questionnaire students were asked to indicate the level of importance they attached to each of seven possible motives for enrolment in the Ph.D. Table 1 (on following page) presents the results obtained from this question.

'Personal satisfaction through engagement in research' and 'usefulness of the skills and knowledge gained to their professional field' were endorsed as 'most important' by the majority of students. Very few students discounted these motives as having been of no importance. Similarly, however, few students also discount the importance of the qualification as a means of improving their career prospects. The overwhelming majority of respondents chose to endorse two or more of the categories listed as being 'most important'. Considering the information in table 1 as a whole, there is no support for the contention that students are enrolling for 'credentialist' reasons only.

Table 1: Motives for undertaking Ph.D. study: UNSW doctoral students

Question: How important were each of the following in your decision to enrol?

	Most important	Of some importance	Of no importance	N
(i) I did well in undergraduate study and it seemed a natural progression	16%	52%	32%	381
(ii) The qualification was seen as useful to improving career prospects	44%	43%	13%	403
(iii) The research skills and knowledge gained were seen as useful to my chosen professional field	48%	41%	11%	390
(iv) I was interested in pursuing a particular research area or topic	51%	36%	13%	397
(v) The opportunities to find suitable employment after graduation seemed limited	8%	18%	74%	376
(vi) It provided an opportunity for a change in field of training or career	10%	25%	65%	379
(vii) It would provide personal satisfaction through engagement in advanced research	64%	32%	4%	402

At an earlier part of the questionnaire we had asked students to briefly outline why they had chosen to undertake a higher degree programme. Most of those who provided written responses similarly mentioned at least two reasons, and often these reasons were expressed in a way which 'fused' two or more of the above categories.

e.g.

> I am interested in the area and would like to make a career in research. I am not terribly satisfied with the sort of mundane work available to me with only the bachelor's degree. I'd rather do research than turning my hand to making more money in other jobs. (Electrical Engineering)
>
> Professional development- increase skills and qualifications for career development. Work gave a good opportunity to complete ... of use to both employer and university. (Psychology)
>
> To enhance promotion prospects in my academic position plus personal interest in the topic. (Professional Studies)

Although previous studies of reasons for entry to Ph.D. study have for various reasons categorised students into 'types', e.g. 'vocational' and 'academic' orientations (Berelson, 1960; Rudd, 1975; Welsh, 1979), the results above suggest that a characterisation of students as belonging to different types - whether 'academic','vocational' or otherwise- would misrepresent the majority of our respondents: reasons which appear dissimilar fit, so to speak, in the same pocket. Also, in the Australian context,it is understandable why for many students the 'qualification' and 'intrinsic satisfaction or interest' motives must co-exist: the personal and financial costs are so high that only a few could afford to indulge in Ph.D. study out of sheer interest or personal satisfaction; and the economic benefits of the qualification itself are rarely likely to be sufficient to fully offset the investment cost of study. Put more tersely, the cost is too high for those swayed only by expressive motives, and the rewards too low for the money seekers.

'Importance and relevance'

The majority of our respondents(59%) had been enrolled as Ph.D. candidates for at least two years. We were interested to find out, in contrast to their views on why they had initially sought enrolment, their current opinions on the importance of the qualification to career advancement. Following this question we then asked for their views on the relevance of their research investigation and the skills and techniques learnt to their current or anticipated work. Table 2 displays the the responses from those students who were currently in permanent professional employment.

Table 2: Opinions on the importance of the Ph.D. qualification and usefulness of the research investigation: Students in permanent employment

(a) How important is the attainment of the qualification(Ph.D.) to career advancement in your work?

	Full-time	Part-time	Total
-Essential	38%	35%	36%
-Important but not essential	38%	32%	34%
-It may be useful, but unlikely to be important	20%	25%	23%
-Irrelevant	5%	8%	7%
N =	66	167	233

(b) How relevant to work in your professional employment are the research investigations and/or skills and techniques learnt during doctoral study?

	Full-time	Part-time	Total
-Most relevant to my professional work	63%	59%	60%
-Some relevance to my professional work	32%	35%	34%
-Not relevant to my professional work	4%	4%	4%
-Not applicable	-	1%	1%
N =	68	167	235

There were few differences in the responses of full-time and part-time students. Although only 36% of the respondents saw the qualification as 'essential' to career advancement, 77% of them regarded the qualification as either essential or important to their career advancement. Also, 60% of the respondents viewed their research investigation and the skills or techniques learnt during their studies as 'most relevant' to their work.

These same two questions, in a slightly modified form, were asked separately for those students who were not yet in permanent employment. Table 3 sets out the information obtained from these students to these two questions.

Table 3: Opinions on the importance of the Ph.D. qualification and usefulness of the research investigation: Students NOT in permanent employment

(a) How important do you believe the qualification(Ph.D.) is for taking up your intended career?

	Full-time	Part-time	Total
- Essential	56%	50%	55%
- Important but not likely to be essential	28%	23%	28%
- It may be useful, but probably not important	10%	14%	11%
- Irrelevant	5%	14%	6%
N =	165	22	187

(b) How useful do you believe the research work and/or skills and techniques learnt during doctoral study will be to your likely field of professional work?

	Full-time	Part-time	Total
- Likely to be most useful	70%	70%	70%
- Likely to be of some use	24%	26%	25%
- Likely to be of practically no use	2%	5%	2%
- No idea	4%	-	3%
N =	168	23	191

Once again, there do not appear to be any meaningful differences between full-time and part-time respondents on these questions. The majority of these students, not yet in permanent employment, regard the qualification as 'essential' to their career aspirations, with only 17% seeing the qualification as irrelevant or unimportant to their career aspirations. Further, 70% of the students believe that their research work and the skills and techniques learnt were likely to be most useful to their intended professional work.

Credentialism revisited

In the introduction to this paper reference was made to a continuing tradition of criticism which excoriates many students as being 'credentialists' - people who pursue doctoral study to obtain the degree and whatever prestige or preferment it might hold, but who do not value the skills, knowledge or scholarship which the experience could provide. Further analysis of the data contained in tables 2 and 3 affords an examination of whether , in the opinion of the doctoral candidature, Ph.D. study provides only a 'credentialling' function (i.e. it provides certification useful to career entry or advancement) and does not provide a useful grounding for subsequent productive work. In table 4 below, the information from the questions in the previous two tables have been cross-tabulated.

Table 4: Cross-tabulations: Importance of qualification X relevance of training

(a) Students in permanent professional employment (N = 230)

Importance of qualification	Relevance of skills, training		
	most relevant	some relevance	not relevant
Essential/important	109 (47%)	49 (21%)	3 (1%)
Not important/irrelevant	31 (13%)	32 (14%)	6 (3%)

(b) Students not in permanent professional employment (N = 185)

Importance of qualification	Likely usefulness of skills, training		
	most useful	some use	no use/no idea
Essential/important	120 (65%)	32 (17%)	2 (1%)
Not important/irrelevant	11 (7%)	14 (8%)	6 (3%)

'Credentialism': When considering (a) and (b) together in the above table, only 5 respondents perceive doctoral study as being essential or important to career aspirations whilst also regarding the skills developed as being of no use or not relevant to professional work. The finding that only 1% of the students hold this 'credentialist' perception of doctoral study is in contradistinction to the view by Williams quoted earlier that many students regard the doctorate as merely a 'convenient label'. One of the five students in this grouping expressed her reasons for enrolment as follows:

> I enrolled primarily as a long-term insurance policy- also for formal recognition of ability.

This same student later claimed to have changed her views about enrolment, stating that she had "only continued because of the time spent. In retrospect I would take a coursework masters".

'Productive utility': 10% of the respondents(42) regarded the attainment of the degree as irrelevant or not important for career advancement, whilst at the same time claiming that the skills and research training were most useful or most relevant to their professional work. Examples of reasons given for enrolling by respondents in this group are:

> I had twenty years practical experience in this subject area, and wanted to utilise data of economic significance, which would otherwise not be analysed.

And:

> I wanted to investigate how design rules in structural engineering are formulated, and to avoid engaging in design using a recipe approach.

Most of the students in this 'productive utility' grouping appear to have been employed for many years in professional positions.

'Intrinsic satisfaction': As might be expected few students (3%) view the degree as neither important for career advancement nor useful in terms of their current or prospective employment skill needs. Some of the reasons given for enrolment by students in this grouping are reproduced below. Generally these were terse to the point of obscurity, but evidently they must relate to meeting strong motives connected with personal satisfaction:

e.g.
- Because of private needs
- At my age it could not be other than an ego trip
- There are questions which need to be answered. I would do the research anyway - getting the Ph.D. is a good way of getting (a) published (b) keeping academically aware.

'Congruent expectations': 229 of the respondents(55%) claimed their doctoral study was both essential(or important) to career, and was most useful or most relevant in terms of its training value. Most students see the degree experience as serving both a certifying and training function. The following two quotes instance reasons given for enrolling by two students within this 'congruent expectations' grouping:

> It is a topic which has concerned me for some time, and the research will equip me to become an expert in my field.

And:

> To be in a better condition to help the livestock industry, through adequate programme analysis and interpretation of results with the research resources available.

'Others': The above four groupings represent the extremes on the relevance/usefulness dimension. The remaining 31% of the respondents fell into the middle category, claiming that the skills and training were of some use or relevance to their current or anticipated work. The majority of these students(63%) saw the qualification as essential or important to career entry or advancement.

DISCUSSION

A continuing problem in Ph.D. education relates to that of clarifying its purposes and ensuring that provisions are such that the purposes are achieved. In recent years this problem has been exacerbated by a cleavage between two quite different perspectives.

(i)'The university mission': A traditional perspective has been to view doctoral study as an integral part of the university's mission to provide a centre of scholarly excellence. In this perspective the concern has been to ensure that doctoral studies retain their essence of providing for the advancement of knowledge and scholarship and with this, academic reproduction. Over the years a rhetoric has grown up which provides a focus for these concerns- a rhetoric called 'credentialism'. The introduction to this paper has alluded to a continuing tradition of criticism based on an apprehension that the university's commitment to academic excellence and the scholarly pursuit of knowledge is being eroded. In this tradition students are impugned for being consumed by 'credentialist motives', and are seen as representing some kind of threat which 'prostitutes the inner core of the university'.

The information obtained from the doctoral students at the University of New South Wales, however, presents a very different picture. If we are to take their responses at face it is just not true that these students can be characterised as rampant credentialists in the sense employed by their critics. Neither in their expressed motives nor in their perceptions is there a flavour of the 'credentialist' outlook.

(ii) 'Student needs': An alternative perspective is that which relates to a concern for students' training needs. In this tradition the concern has been expressed that the degree should function not only to certify or credential attainment, but that it should also be useful in providing a training relevant to productive work in the students' professional life. Here, the universities are blamed for adhering to traditional forms without regard to the changing needs of students. Within this tradition of criticism Chancellor Dungan has inveighed against universities for being willing to expand their doctoral intake to include large numbers of students who intend to use the qualification to pursue careers quite removed from scholarly or academic concerns, whilst at the same time taking no action to ensure that the training provided in the degree is of real productive use. Dungan labelled this trend 'credential madness' (Dungan, 1970).

In Australia, Cowen (1972) has elaborated on Dungan's concern, with special reference to a form of 'credential madness' that is seen to exist in our universities - the situation where academic staff who have already demonstrated competent scholarship are required to engage in doctoral study to secure advancement. Sir Zelman Cowen colourfully observes that "One of the nuttiest inheritances from the United States is the Ph.D. obsession"(p.24). More recently Rogers (1979) has perceived Ph.D. education in Australia as being for many students devoid of professionally useful training components. The recognition that in many instances the Ph.D. does not provide a training relevant to professional needs has, in Rogers' view, produced the undesirable situation where the Ph.D. has come to "...be regarded simply as a qualification, an indication that a student has reached a certain intellectual standard"(p.46).

In contrast to the 'university mission' viewpoint, this second perspective argues for the need to adapt or change doctoral provisions to make the degree more 'useful' to productive professional work. This perspective, arguing as it does for change, runs parallel to the previously instanced studies by Armstrong, Hill and others in which doctoral degree training was seen as poorly matched to students' career destinations and consequent professional work demands.

Given the comprehensive empirical bases for many of these studies, and the knowledge that few students today can realistically expect to enter academic careers, it was surprising to find in the present survey such strong support for the view that the training undertaken was most useful or most relevant to anticipated or current professional work. In previous publications based on the present survey (Barrett et al, 1983; Barrett & Magin, 1983) a number of areas were identified in which students expressed dissatisfaction or concern. Those most commonly mentioned included poor employment prospects, protraction of research investigation, supervision difficulties, and inadequate resource support. It was rare to find any reference to inappropriateness of the training undertaken for subsequent professional work demands.

Prior to analysis of the survey it had been expected that the questionnaire data, including written comments, would provide information supporting arguments for making Ph.D. training more relevant to students' needs. This did not eventuate. How then can these 'awkward results' be explained?

It could be argued that doctoral candidates are simply ill-informed about how useful in practice their training will be. Some support for this explanation may be seen in the recent finding of the Hill working party (Hill et al, 1983) that many Australian research degree students are quite unclear about their likely career. According to this report "between 37% and 47%" of those students on the verge of completing their research degrees "were quite indefinite about their future employment"(p.131). One aspect of our own survey, however, makes this explanation less compelling: for those students who are in permanent professional employment(235 students), who presumably are quite well informed about their professional work demands, the majority (60%) still claim that their research investigations and training are 'most relevant' to their work. Only 4% of these students perceived the training to be 'not relevant'.

A different explanation could be put forward. Although most students anticipate that an academic career is unlikely many of these students(at various parts of the questionnaire where comments were made) mentioned the desirability of taking up a university post. It is possible that the conflation of expectation and desirability has influenced their perceptions of usefulness and relevance.

An alternative to these explanations of 'awkward results' is to accept at face that from the students' perspective the Ph.D. provisions are in little need of change in terms of increased relevance- that the Ph.D. as it presently functions provides sufficient flexibility to meet students' varied professional needs.

CONCLUSION

Contrary to the impression gained from a long history of criticism of the Ph.D. there appears no foundation for the claim that 'credentialism' has taken hold amongst doctoral students. Neither in their motives for enrolling nor their disposition to highly value the training experience could students be fairly characterised as 'credentialists'.

Earlier in this paper it had been put forward that the debate about Ph.D. structures and provisions had been engaged in from two different perspectives: a 'university mission' perspective which advocates a return to traditional purposes in which Ph.D. education is seen to provide for the advancement of knowledge and discipline-based scholarship; and a 'student needs' perspective which advocates changes to provide a more professionally relevant training. The information yielded from the present study indicates that there are some arguments used on both sides of the debate which can be seen to be no more than shibboleths.

First, the 'university mission' argument has no legitimate prop for its claim concerning student 'credentialism'. It is no more than rhetoric. The arguments supporting their views need to appeal on grounds other than credentialism.

Second, proponents of change towards a more utilitarian training have been able to draw upon a body of studies in Australia which have documented a lack of fit between doctoral training and the subsequent career destinations and professional work demands of graduates outside academia. On the presumption that many students would be aware of this lack of 'fit', the claim has been made that the Ph.D. has come to be regarded 'simply as a qualification'. In the light of the present findings this would seem to be a dubious claim. We have found no evidence that students view the Ph.D. as providing little more than a qualification. From the survey at the University of New South Wales it is quite apparent that lack of relevance is not an issue of concern. Whatever the explanation for this- are students ill-informed, ill-placed to realistically consider the question?- the fact remains that there is no evident discontent about the lack of relevance of the training undertaken and the skills developed during their studies.

The question of how useful the training is in practice cannot be addressed through simply surveying students during their candidature. An adequate approach to resolving the issue would require not only the examination of current degree procedures and practices, but would need to incorporate analyses of career destinations, 'on the job' studies and employer judgements. In Australia there have been several studies which utilise information of this kind, and these have attempted to identify ways in which Ph.D. education could be re-structured to provide training more relevant to students' professional needs. An outstanding example of this is the study undertaken by Hill, Fensham and Howden(1974). As foreshadowed by Armstrong and others(1966), however, there has been a reluctance to fully implement changes in Ph.D. provisions which would make the degree training more relevant to professional needs. This reluctance is seen as a manifestation of the disagreement which exists with respect to the purposes of Ph.D. education in Australia. If progress is to be made on resolving the issues in contention and in determining what actions should be taken to improve doctoral education, there is need to purge the debate of ill-founded claims in relation to students' motives and perceptions.

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CHAPTER 7

REVIEW AND EVALUATION

The evaluation of teaching for formative and summative purposes continues to be an issue of contention in Australian institutions. Although much work has been done in clarifying the issues and measuring the effects of teaching both here and overseas, we still find ourselves reiterating the need for institutions to value and reward teaching and to examine their assumption that research output can be evaluated while teaching cannot. Johnson (1982) in his review of Australian academic development units said:

> Almost no institution in Australia has a systematic procedure for collecting full and reliable evidence on the teaching performance of its individual or collective academic staff; and when chided about this, the authorities reply: "It is very difficult". These institutions exist to do the very difficult; they exist to carry out research into the unknown, to master advanced technology and to prepare large numbers of students, most of them of moderate calibre, for exacting professions. Until they seriously set about the not impossible task of evaluating their teachers, rewarding the good, improving the weak and removing the utterly hopeless - if such there be - from a teaching role, their claims to value teaching highly must be treated as velleities, not expressions of real will.

Several papers in this section refer to the Australian reports of the past few years which have exhorted institutions to take seriously the facilitation and encouragement of excellence in teaching; it is disappointing that in 1984 there is so little evidence that institutions have responded.

In this chapter Thomas contributes a general discussion of the importance of the relationship between evaluation and excellence. Barham and Ross's short paper contains practical suggestions to a Committee of their university on the evaluation of teaching for appointment, tenure and promotion. The paper by Moses is an empirical study of the components of good teaching as perceived by students, and she shows that the conclusions of her study correlate well with similar overseas studies. Iredale describes an interesting project in which staff voluntarily undertook formative evaluation of their own teaching, and she found that colleague evaluation, though most feared initially, was judged most helpful in the event.

Kay and Prosser's paper is the only account in this collection of a formal course review - in this case analysed into three types of outcomes: for the course, for the subject specialist, and for the curriculum specialist. Fairly unusually for this country the paper describes the role of a sensitive curriculum specialist in facilitating potentially difficult aspects of such a review. Finally, Paget looks at the implications for the interpretation of student course evaluations of self-reported interest in the subject.

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EVALUATION AND THE PURSUIT OF EXCELLENCE

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ABSTRACT

This paper argues that evaluation of academic performance and the pursuit of excellence are compatible concepts. Evaluation of academic performance is shown to be a vital component of any comprehensive co-ordinated program to foster excellence in all aspects of academic performance. Extracts from two recent reports - one dealing with Staff Development, the other with Academic Tenure - pose important questions about established practices in universities and challenge universities to initiate policies and programs that are seen to foster excellence in academic performance and that check on the achievement of this goal. Key elements of a comprehensive co-ordinated program are identified. While programs may differ in each institution and even for different sections within an institution to meet specific needs and circumstances, the general thrust of such programs is quite clear. What is still required in institutions is a recognition of the needs and a commitment to take positive, constructive and creative action.

EVALUATION AND THE PURSUIT OF EXCELLENCE

Linking the concepts "evaluation" and "pursuit of excellence" is unlikely to be popular on university campuses. The reaction to two recent reports which made this link, the AVCC Working Party on Staff Development and the Senate Standing Committee on Education and the Arts *Report on Academic Tenure*, has been distinctly cool. There is widespread fear and suspicion about any mention of the evaluation of (or an accountability for) academic performance. For many in the university evaluation and accountability embody all the evils that are perceived to threaten cherished academic traditions - particularly those of tenure, academic freedom and university autonomy. Yet, judgements about academic performance are being made continually and not always using adequate procedures or based on well defined criteria. In fact it was suggested in the Senate *Report on Academic Tenure* (p.14) that the capricious exercise of power within a university poses a much greater threat to academic freedom than any well designed and open form of evaluation.

In this paper I am arguing that these two reports offer an opportunity to make a positive, creative response to the external pressures bearing on university functions. Further, I am proposing that the proper use of various evaluation techniques in conjunction with a range of personal, professional and organizational development activities will promote and encourage excellence in all facets of academic responsibility and thereby contribute to the protection of the cherished traditions of tenure, freedom and autonomy.

EVALUATION

The university community has a curious ambivalence about evaluation; it is quite happy to evaluate the performance of others (e.g. students, business, government) but treats with the gravest suspicion any mention of evaluation of its personal or corporate performance. This type of evaluation is considered to lie outside the realm of normal activity of a university and thus any entity within a university which is the subject of an evaluation is regarded as being "in trouble". The outcome of the evaluation is expected to be punitive: the purpose of the evaluation being to identify and purge trouble makers and weak links; to nominate scapegoats; to seek justification for decisions and actions already taken e.g. the curtailment of services or the pruning of programs.

This unfortunate view about evaluation received considerable reinforcement through the actions of the Administrative Review Committee (commonly known as the "Razor Gang") set up by the Fraser Liberal Government, which harshly treated tertiary education, public education and social welfare programs.

In the wake of the "Razor Gang" activities, the actions of some "Review Committees" on university campuses adopted a similar approach, with their lack of objectivity and sensitivity and with their logic-defying judgements. This further heightened the fear and suspicion of university staff about the evaluation process in relation to academic performance. Thus evaluation has been branded as the weapon of the philistines in their assaults on academic freedom and invasion of university autonomy.

With this prevailing attitude in academic circles it is hardly surprising that the reports of two committees (spawned in the era of the "Razor Gang"), the AVCC Working Party on Staff Development and the Senate Standing Committee on Education and the Arts, have been roundly criticized and then largely ignored on university campuses. This is a pity. Both reports have many positive things to say about the proper conduct of university affairs in the realities of present day society. The two reports are complementary. Both identify evaluation procedures (or the lack of them) as a serious weakness in the management of university affairs. Both reports contain *suggestions* which might be explored and developed in a professional, constructive and creative response to the pressures on a university in a modern society.

PURSUIT OF EXCELLENCE

That "pursuit of excellence" is and should be the goal that motivates university activities will provoke little argument or dissent. "Pursuit of excellence" was used as a significant argument in the submissions of various university groups to both the tenure and staff development enquiries. There *will* be argument about the meaning of "pursuit of excellence" in practical terms.

The predominant view in universities is that "pursuit of excellence" is synonymous with research activity. This view is institutionalized by the administrative and reward structures within the university. Typical of this view is the oft quoted (but unsubstantiated) tenet that "Good researchers are the best teachers". This tenet is held with considerable tenacity and stubborness, even in the face of a large and growing body of evidence to the contrary (e.g. Centra 1983; Friedrich and Michalak, 1983).

The way in which "the pursuit of excellence" is applied and administered in universities has led to severe distortions in activity, even to the neglect of some important functions, and almost certainly to serious injustice to many individuals. In modern society, as in the past, universities have a responsibility for the transmission and interpretation of knowledge to students and the wider community; for training new entrants to some professions and the training of future academics. Thus universities do not exist for their own sake, nor do they exist solely to conduct research. In fact universities are not the only organizations conducting research nor are they necessarily the most prolific sources of new knowledge. There are some recent studies of university academics' publication rates (e.g. Ladd & Lipset, 1977; Guba and Clark, 1978; Liu, 1978; Schaeffer and Sulyma, 1979) which indicate that university academics are not very active in publication. One recent study in the USA (Centra, 1983) reported that in a five year period academics in science related disciplines averaged 2.5 publications, while humanities/social science academics averaged 1.7. What counts as a publication varies enormously, from a brief note to an original work of perhaps several volumes. Nor is the size of a publication a valid measure of the amount of research involved in producing it: a long and intricate series of experiments may provide important results which can be written up in a single short paper, whereas a lengthy book may be little more than a digest of work of others. Difficulties in defining valid measures of research are discussed in West, Hore and Boon, 1980. Centra (op. cit) found, further, that just on 50% of the academics surveyed had no publications in the five year period studied. West, Hore and Boon, (op. cit) using a publication rate index which awarded fractions for jointly authored papers and multiple points for monographs, found that over a four-year period almost two thirds of academics in one Australian university faculty had one or fewer points, with more than one third publishing nothing at all.

The predominant view that "pursuit of excellence" equals research and publication is far too narrow given the complexity of functions of a modern university, and is a significant factor in limiting the initiatives taken by universities in their attempts to cope with the current political and economic environment. The cutbacks in national research expenditure coupled with the general reduction in expenditure on tertiary education has had a depressing effect on research productivity. Although there are some encouraging signs of a reversal of funding trends it is unlikely there will be a return to the heady levels of the late 1960's and early 1970's. This all points to the inappropriateness of the current emphasis on research in university reward structures.

There is no logical reason why the notion of "the pursuit of excellence" should not apply in all areas of university activity. Thus:-

- teaching, instructional development and innovation
- student learning
- research and publication
- administration
- service on university committees
- service in professional societies and associations
- consultation outside the university in both government bodies and private enterprise

- public service

are all facets of academic activity in which excellence of performance can and should be a goal, and for which due recognition should be given in the administrative and reward structures of a university.

It is only through this broader application of the concept of "the pursuit of excellence" that opportunity for internal growth, renewal and development is possible. The slavish perpetuation of the research myth can only continue to depress morale and ultimately harm universities because of their diminished relevance in society.

THE TWO REPORTS

Both the report of the AVCC Working Party on Staff Development and the Senate Standing Committee on Education and the Arts Report on Academic Tenure express the view that attainment of excellence is broader than the narrow research centred concept described above.

The AVCC Report on Staff Development saw excellence being achieved through the establishment of comprehensive policies and programs of staff development. An important feature of these programs is evaluation and they recommended:-

> That each university should develop a declared staff development policy incorporating - ...
>
> d. a formal evaluation program for all staff involving systematic and regular review of all roles. Such evaluation should be comprehensive both in terms of activities evaluated and sources of evaluative information used. Evaluation should be undertaken for both formative and summative purposes.

The Working Party paid particular attention to the teaching function of academics which they identified as an area of weakness in academic performance. The Senate Committee concurred with the recommendations of the AVCC Working Party (p.66) and also identified two areas of deficiency in academic performance, namely -

> ... the presentatation and techniques of undergraduate teaching and in the regular review of an academic's research and teaching goals. (p.22)

The Senate Committee Report on Academic Tenure accepted the importance of tenure in the achievement of excellence. They concluded

> ... it is clear that the advantages of the tenure system are substantial and cannot be lightly dismissed. Tenure provides the security of employment and remuneration which allows the freedom of inquiry essential to academic work. While tenure may not be strictly necessary for effective teaching or research, it certainly enhances scholarly work. Without tenure provisions it would be more difficult to attract highly qualified staff to academic work whether from overseas or within Australia. Tenure is also an important foundation for long term research commitments and provides the essential stability for building up centres of excellence with widely appreciated academic reputations. (p.23)

But - "Even the strongest supporters of tenure do not see it as a protection for incompetence". (p.44)

So the Senate Committee affirms that -

> ... one of the basic premises for tenure is that an academic maintain a continuing standard of performance and academic contribution in teaching, research and scholarship. Thus there should be a continuing accountability by each academic to the higher education institution of which he or she is a part. It is the Committee's view that a merely informal accountability through conversations with and regard by one's peers remains inadequate. What is required is a more explicit and regular review which is effective, and is seen to be effective, in ensuring that a tenured academic is accountable for maintaining high standards of teaching, research and scholarship. (p.67).

This broad objective is taken further in later paragraphs where a detailed program is suggested.

It is clear from these few extracts that both reports see evaluation as an important component in the management of university affairs in pursuit of the goal of excellence. There is of course room for debate about the specific evaluation programs that might be implemented in particular institutions. The two reports contain some suggestions and ideas that might be included in a comprehensive program. Unfortunately the academic community chose to consider the suggestions in these two reports as prescriptions and launched strong attacks on specific proposals and ignored the real and potential value of the fundamental argument.

A CO-ORDINATED COMPREHENSIVE APPROACH

I have argued elsewhere (Thomas, 1980) that there is a need for a co-ordinated comprehensive response to the pressures (both internal and external) facing academic institutions in the latter part of this century, to keep them as vital, productive centres of excellence.

The elements of a co-ordinated comprehensive program and the relationships between them are shown in the diagram below.

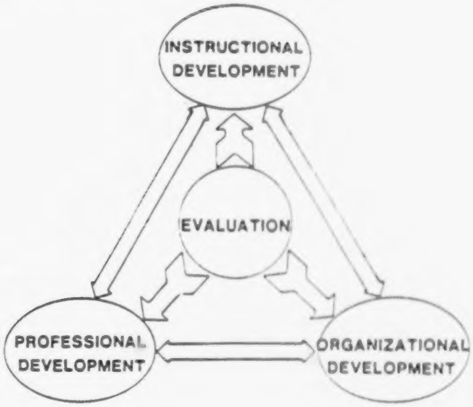

FIGURE 1
Aspects of Staff Development and Relationships with Evaluation

It is not my intention to be prescriptive about the specific components in such a diagram. There is growing evidence to suggest that a different approach would be appropriate for each institution to accommodate specific and special needs and perhaps that different criteria for evaluation of performance and different support programs might be needed for academics in different faculties (Bloom, 1983; Roskens, 1983). The foregoing does not deny the need for an overall policy in an institution and the commitment to establish and maintain the program.

The important components of a co-ordinated comprehensive development program would seem to be -

1. An organizational development program which includes procedures:-
    - to respond to changing student populations and needs;
    - for improvement of student retention strategies;
    - to review student selection and exclusion practices;
    - to improve instructional and learning practices to ensure a higher student completion rate;
    - to evaluate staff performance in all facets of academic function;
    - to provide a comprehensive staff development program covering all facets of staff responsibility (including non-academic staff);
    - for adjustment of timetables and course requirements to serve student populations better;
    - for the provision of reward structures and support services that recognize the complete range and importance of academic functions;
    - to develop contacts and interaction between the institution and the community in general, and with specific sections of it, e.g. government departments, industry, school.
2. A professional development program that includes provisions for:-
    - evaluation of academic performance;
    - sabbatical and study leave;
    - conference attendance;
    - job retraining;
    - life and career planning (incl. early retirement options);
    - temporary job placement or exchange with other institutions, aid programs, public service or industry;
    - job sharing and other part-time employment approaches;
    - instructional development activities;
    - involvement with professional associations;
    - assistance with obtaining grants for research and other projects.
3. An instructional development program supported by an adequate technical support service to enable implementation of instructional innovations, improvements and developments. The program might include -
    - training in teaching skills;
    - consulting and counselling services;
    - evaluation of performance;
    - instructional research;
    - grants to undertake instructional development projects;
    - secondment programs to enable placement in an instructional

development unit to develop programs or to serve as a consultant for peers;
- rewards that recognize the importance of excellence in teaching performance.

4. Evaluation programs and support services which assist in the review of all aspects of academic performance. The programs might include

- assistance with the design of evaluation studies;
- manpower and data processing services;
- counselling and interpretive services.

This listing of specific components is not exhaustive. Most campuses will have some elements of such a program in some form or another, but few, if any, have a comprehensive, co-ordinated program supported by clear policies.

The thrust of the two reports mentioned earlier in this paper is an invitation, a challenge to universities to take a positive, constructive, creative approach to the problem of establishing policies and programs that encourage continual renewal and incentive for staff to pursue the goal of excellence in all facets of their work. By such action universities will be keeping the initiative in the continual battle to retain autonomy.

A smug, self-satisfied retreat behind historical precedents and practices, stentorian denials of the mild rebuke contained in the two reports is hardly likely to improve the standing of the universities in the eyes of the community nor to aid in the achievement of university goals.

CONCLUSION

In this paper I have argued that "evaluation" and "the pursuit of excellence" are compatible concepts, and that evaluation is a vital component of a comprehensive co-ordinated program to foster excellence in all aspects of academic performance.

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EVALUATING TEACHING

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The senior selection committee at Griffith University recently asked the Centre for the Advancement of Learning and Teaching for advice on how it might improve its procedures for judging teaching performance. This paper outlines the factors that we took into consideration in developing our advice to the committee, and then describes the procedures that we recommended. All seven of the academic staff in the Centre participated in drawing up the advice so it is very much a collective effort. Ian Barham and I present the paper on behalf of our colleagues.

Most personnel decisions at Griffith are made within the Schools of the University - that is, decisions on appointment, award of tenure, and promotion of staff up to and including Senior Lecturer level are made within each School. Appointments at, and promotions to, Reader and Professor level are made by the central Senior Selection Committee.

There are three alternative major criteria for promotion to Reader. Candidates may make a case based on excellence in teaching, or excellence in scholarship and research, or excellence in contribution to the University. In addition to the major criterion staff are required to demonstrate achievement at a high level of competence in all aspects of their work - teaching, research and contribution to the University. So the Committee is required to make judgements on the teaching performance of all applicants for promotion to Reader or Professor. The Committee, however, found it difficult to judge teaching, did so superficially, and never demanded high standards either in teaching or in the processes for judging it. This practice was repeated in most Staff Committees of the Schools of the University.

The problem, we felt, was not any stated opposition to the idea of assessing teaching as well as research (although no doubt some diehards probably still think that only research is important). The problem lay in a genuine lack of knowledge of how to assess teaching and a lack of faith in methods which pretend to offer accurate mesurement of particular or necessary skills or activities which constitute teaching.

There is no such lack of faith in the ability to judge research. This is not to say that the judgement of research quality and productivity is not often done badly. And comparisons are difficult, if not impossible. (Is this marine biologist better than that political economist?) But there is a strong faith in the ability of peers working in a particular area to judge the quality of research performed by others in that area. That faith is probably not unjustified. (You might like to ask the question of yourself. Consider the area of your special expertise. Consider a colleague who has published in the same area. If you had read carefully the published and unpublished reports of the recent research of that colleague, could you make a judgement of its quality as expected of a Professor, Senior Lecturer, Lecturer or whatever? Most people believe they can.)

What makes this possible and why should a staff committee accept the judgement? Firstly, what is being judged is known. It can be defined. An account of the research is tangible. You can touch it, handle it, and refer back to it. Secondly, there is probably no better way to get a judgement of its quality than to ask people who, first, know the area, and, second, know the standards expected.

If those two factors - first, specification and knowledge of what is being judged and, second, acceptance of informed peer judgement - work for research, we said, we should attempt to make them work for teaching. (Perhaps you would like to test yourself again. Consider the two or three teachers in higher education whose teaching you know best. Can you rank them globally? Can you say whether you think they are worthy of the status they hold because of their worth as teachers?)

We had to suggest processes which would enable a staff committee to be sure that it knew what it was judging when it attempted to judge teaching; knew what referees were judging when they expressed a judgement; knew the grounds on which their judgement was made, and their capacity (through first-hand knowledge) to express a judgement. The staff committee finally had to be aware of the evidence it was using in arriving at a judgement.

There is a two-stage process in what a staff committee does - perhaps a sort of echo. A staff committee itself (or certain members of it) may have knowledge of an applicant's work, evidence of its quality, and may be able to make a first-hand judgement, on the basis of its own knowledge. At the same time, however, it will often have to rely on referees.

So when we talk of being specific about what is being judged, and being clear about the evidence and the basis for judgement, we mean that the staff committee has to do that for itself, when it is making a judgement. It will also have to do it, and this is the echo, when it deals with referees and their reports - ensuring that referees (and later the staff committee) are clear first, about what it is that they are commenting on, and, second, the bases for their judgement. (On another occasion we referred to two sorts of expertise required in a staff committee - first order expertise being the capacity to make a judgement based on one's own knowledge, second order expertise being the capacity to make a judgement based on the judgements of others.)

To return to the processes we suggested: one step in the process did not relate to either of the two major factors. It was a suggestion designed to ensure that the staff committee devoted adequate attention to teaching. The suggestion was that where a staff committee was required to assess both the research and the teaching of a candidate, it should do so at separate meetings. Thus we suggeted a staff committee should:

Step 1

Ask the candidates to give the committee-

(1) information on their activities in teaching
  - the courses taught, and for each course, the type of course and the candidate's particular responsibilities in the course;
  - the students (honours/postgraduate) supervised;
  - membership of planning/design/review/assessment committees;
  - other responsibilities.

(2) an elaboration and interpretation of their tasks and responsibilities
- their roles in teaching teams, committees, etc.;
- other explanations of tasks and responsibilities;
- participation in preparation of course outlines;
- comments on course outlines.

(3) material or other information which would assist the committee to make a judgement
- the elaborated outlines of each course;
- other course/programme/review documents/materials;
- assessment results and assessment board comment;
- progress rates of supervised students.

(4) comment on their own performance
- reference to circumstances that may have influenced performance

(5) other evidence of standard of performance
- student opinion included

(6) a list of referees
- with indications of the area or areas on which each should be qualified to comment.

Step 2

Verify the information from applicants.

- Some information on tasks would be available routinely.
- The committee would need verification and expansion of the interpretation of the candidate's tasks and responsibilities.

Step 3

Obtain referees' comments and judgements.

- Some nominated by the applicant.
- Some selected by the committee with an attempt to get opinion in all important aspects of the applicant's tasks and responsibilities.

The committee should be specific in its request to referees, asking for
- A statement of what a particular referee is commenting on.
- An interpretation of the candidate's tasks and responsibilities.
- The ground on which any judgement is being made.
- A judgement.

Some referees might be sent materials by applicants. An example of this might be course outlines.

Step 4

The analysis of information leading to judgements.

- The committee needs to specify clearly what it is evaluating.
- It assembles any evidence it has itself on the various tasks and responsiblities of an applicant.
- It assembles the opinion of referees and checks the basis of the referees' judgements.
- It may need to seek further information from the applicant or referees.
- It makes its own judgement.

We would like to draw your attention to three features of our advice. Firstly, we have not attempted to define the teaching responsibilities of staff. We recognise that this varies from individual to individual. Secondly, the major emphasis of our advice is to require the Committee to be absolutely clear about the specific tasks and responsibilities that it is judging in each case and for it to require the same from referees. Thirdly, you will notice that we have made no attempt to quantify any of the information that the Committee uses or to quantify its judgements.

WHAT ARE SUPERIOR UNIVERSITY TEACHERS' STRENGTHS IN TEACHING?

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The value of any feedback questionnaire for student evaluation of teaching lies in the amount of useful information it can provide to the lecturer evaluated. 'Useful' is information with clues, hints, suggestions for change in lecturer behaviour, attitude, course organisation or assessment; or which provides positive reinforcement of strategies adopted.

Two questions which prompt students to think about these issues are used in our evaluation of teaching questionnaire: "What are this staff member's strengths in teaching?" and "What improvements would you suggest?" The order is deliberate. There is a very practical reason: most students tend to respond to the first open question, a lot fewer to the second, and requests for further produce little. Student comments are generally constructive; but harsh personal criticism can outweigh overwhelming positive response. Having to reflect first on the lecturer's strengths is one way of putting the criticism into perspective. And lecturers need to be aware of their strengths, to build upon them, and they need student acknowledgement of such strengths. This motivates them to act upon suggestions made in the subsequent question.

This paper examines the perceived strengths of staff who were rated highly in recent student evaluations of teaching. In 1982 the Education Committee of the University of Queensland's Academic Board encouraged a systematic approach to the evaluation of teaching in order to obtain data on the teaching ability of staff on probation. The conditions for tenure spelt out that "satisfactory" performance of staff was expected at the time when the award of tenure was being considered. However, when staff apply for promotion, teaching performance must be well beyond satisfactory. For promotion from senior lecturer to reader, for example, it must be either "superior" (with outstanding research) or "outstanding" (with superior research record). How these qualities and achievements are defined has not been determined and therefore must, by necessity, be subjective.

Generally it is known among students and staff who the really bad teachers are; but superior or outstanding teaching is not always recognised, partly because some staff are suspicious of popularity with students, partly because teaching is still a rather private affair between lecturer and students. There is no agreement on what makes a lecturer superior or outstanding: student achievement? student general education? retention of students in the course? When does the effect of the teaching manifest itself - at the end of each class? end of semester? or when in the workforce? Superior teaching might mean something specific for students - as we will see later; something different for the university administration or colleagues in the department, and for the educational developers with their own educational philosophy.

But there is consensus that 'teaching' includes much more than classroom presentation, that it includes course development, course preparation, course organisation, preparation of resources, supervision of research projects, and, of course, assessment, as well as student advising (Murray 1980).

The literature on evaluation of teaching agrees (Murray 1980) that student evaluations are valid and reliable indicators of aspects of teaching performance, classroom presentation and course management. (Unlike the official documents of the University of Queensland I prefer to speak of teaching performance, not teaching ability. The whole notion of professional development would be absurd if we did not believe that staff could improve their performance, and that their ability is not reflected in the performance.) The questionnaire used in our student evaluation of teaching has three parts, designed for both summative and formative evaluation. It addresses in the standard part those aspects of teaching over which the staff member has control and to which students can legitimately respond.

The first part contains nine standard or core items which were selected in accordance with the literature on evaluation and approved by staff at this University (Moses 1983). Results from this part could be discussed in the annual appraisal interview of head of department and probationer. The second part contains two questions only, one global question relating to satisfaction with the subject, and one asking for the overall effectiveness as a university teacher. The ratings on this latter question only would be suitable (Scriven 1981) to be kept in the personnel file to be consulted for tenure decisions. The third section has room for 12 additional items which staff might choose from an item bank of about 80 items, and to which they can freely add. This part is for feedback only and enables staff to tailor-make the questionnaire to suit their specific feedback needs and teaching situation. The back page contains the two open questions mentioned above.

Teaching in a total of 372 class groups has been evaluated over three semesters, involving 128 different staff and over 9600 students. Students, on the whole, rated their lecturer more favourably than they rated the subject. The responses to the two questions, "How would you rate this subject?"and,"All things considered, how would you rate this staff member's overall effectiveness as a university teacher?" are reproduced below. On a scale of 1=very poor, 4=satisfactory, 7=outstanding, the following results were obtained.

Percentage of students giving each rating:

	1	2	3	4	5	6	7	Mean rating
Subject	2	4	11	26	33	21	3	4.6
Teaching	1	2	7	19	32	33	6	5.0

While many lecturers were rated highly by some students, a much smaller proportion received average ratings of 6.0 or higher. If we consider a rating of 7 as outstanding, we might call 6.0 superior. Teaching in 11 per cent of the class groups received a mean rating of 6.0 or higher. Among the staff were males and females, teaching assistants and professors representing a wide variety of departments. The classes they were teaching were described as lectures, tutorials, clinics, studio. The factor common to most of these highly rated classes is that they were small groups.

The effect of a number of variables on the overall effectiveness rating are being monitored, e.g. class size, teaching method used, sex, age and status of lecturer, type of assessment used, whether the subject is a compulsory or elective one. So far only class size seems to have a determining influence on student rating.

Mean ratings on the overall effectiveness of staff in Semester 2, 1983 repeat the pattern noticeable in the two previous evaluation rounds:

Class size	Mean rating on overall effectiveness as a university teacher
	(scale 1-7; 1=poor, 4=satisfactory, 7=outstanding)
Fewer than 10 students	5.7
10-20 students	5.4
21-50 students	5.2
51-100 students	5.1
Over 100 students	4.5

Therefore, an arbitrary mean rating cannot be taken as a demarcation between, for example, satisfactory and superior teachers. An average rating of 6.0 in a small group teaching situation, whether tutorial, seminar, studio or clinic is not unusual. More than half of student respondents who were taught in small groups rated the teaching 6 or 7, in contrast to students in classes of medium size (21-100) of whom 42 per cent rated it 6 or 7 and notably to students in large classes - only 24 per cent rated the teaching 6 or 7. Thus a lecturer lecturing to a class of over a hundred students might well be called 'superior' if the average rating is 5 or higher.

The class size not only increases diversity in student reaction to the teaching, but it determines to some extent the format of the class. Lecturing to a class of 200 provides little opportunity for student-lecturer interaction. Lecturing to a class of 10 or 20, however, takes place in a group where interaction is possible and is frequently encouraged, so that "lecture" classes might be, in effect, a sequence of lecture input, question-and-answer sessions, discussion, lecture input. A number of staff who were evaluated highly in their "lecture" class used this format, which, in its most informal form resembles many structured seminars or tutorials.

CASE STUDIES

From the group of staff who received ratings of 6.0+ in small group teaching, or 5.0+ in large group teaching situations I have selected some case studies to exemplify superior teaching from the students' point of view in a variety of disciplines and teaching situations.

A is lecturing in a second year compulsory Engineering subject to over 200 students.
B is lecturing and tutoring in first and second year Government subjects.
C is lecturing and supervising studio work in undergraduate and postgraduate courses in Regional and Town Planning.
D is teaching an eight-week intensive program of clinical surgery, including outpatient clinics, ward rounds, seminars, tutorials to fifth year medical students.

E is taking clinics in Operative Dentistry for fifth (final) year Dentistry students.
F is tutoring in a first year English subject.

A - Lectures in Engineering

A is a Reader in the Department of Mining and Metallurgical Engineering. He is in his late thirties and has been teaching full-time since 1972. He is equally interested in research and teaching and enjoys the challenge of teaching large groups. He has been seeking student feedback in a systematic way for years and has both adapted his teaching accordingly and received confidence in his teaching from evaluations.

The subject where his teaching was evaluated by us is a compulsory second year subject, taken by students in all of the five Engineering departments. There have been many complaints by staff and comments by students about poor discipline in Engineering classes. Dr A noted that he had not had any problems.

The questionnaire was filled in by 157 of 260 students. They rated the subject on average 4.8 (4 being satisfactory), with the majority of students rating it 5 or 6. His teaching was rated higher, 5.4 (the average for classes of this size is 4.5). The ratings on the questionnaire pointed to his particular strengths: subject knowledge, his enthusiasm for the subject which he communicated to his students, and his use of examples and illustrations, together with clear speech.

The comments relating to his strengths as a teacher confirmed this. They showed a very high appreciation of his wide and deep knowledge, together with his practical experience from his consulting work which enabled him to give relevant practical examples. So students commented on the interesting way he presented the lectures and on the enthusiasm he showed for the subject. Students found that he structured the material well so that they could understand it. He explained well and spoke clearly and concisely so that they ended up with a good set of notes.

Many students also commented on his willingness to answer questions in class and to help students outside formal class hours. A few mentioned that he relates well to students, has a sense of humour, good manners and understands where mistakes in understanding subject material can be made - an empathy with student thinking.

Eleven students mentioned specifically that he handles the class well, is in control, has their attention. Some students directly related this to the way he lectured.

Below are some comments which summarise student perception of Dr A's strengths in teaching:

> His main strength is that he is very interested in the subject, and has considerable experience from which he can draw motivating and illustrative examples. He also makes most students interested by his enthusiasm.
>
> Obvious interest, enthusiasm and knowledge. Easily heard. A lot of practical experience with which he relates the lecture material.

> Very tolerant of students. Handled any class disturbance with exceptional ease. Spoke clearly. Was enthusiastic.
>
> Presents material very clearly. Best lecturer I've had. Makes lectures interesting, and thereby has great control over class, i.e. no disturbances because of boredom.

B - Lectures and Tutorials in Government

B has been teaching in the Department of Government for three years and, at the time of the evaluations and interview, was just finishing her probationary period as lecturer. She is in her early thirties and has previously taught in secondary schools in various countries, as junior lecturer and in part-time positions at a number of tertiary institutions.

As an academic she likes a balance of teaching and research, she sees her research as benefitting her teaching, although most of her time is devoted to teaching. She has had her teaching evaluated for two subjects in which she both lectures and tutors, and in all three semesters has received above average overall ratings. The average rating for all the class groups improved over time. The lecture class and tutorial classes where she was rated 6.0 and higher are examined here. The subject is a second year Government elective. She is in charge of the subject and does all the lecturing and tutoring for it.

Twenty-five of the 60 students 'on the book' for the two-hour lecture class returned questionnaires. The subject was not rated as highly as the teaching, opinions were rather divided, but her "overall effectiveness as a university teacher" was rated, on average, as 6.0. The lecturer received very positive feedback on items related to her lecturing technique and organisation: structuring the material, lecturing at the right speed for note-taking, communicating her enthusiasm for the subject, requiring reading appropriate for the subject. The assignments tie in with the course objectives, and the lecturer is willing to assist.

The lecturer also sought feedback on learning outcomes. Three-quarters of the respondents thought that they had learned to think critically, to work independently and take responsibility for their own learning.

Twenty-three of the 25 respondents commented on the lecturer's strengths. Her style of lecturing attracted most comments: it is easy to follow, she communicates well and speaks slowly and clearly, appropriate to good note-taking. Her mastery of the subject material is noticed. She is perceived as well prepared, and it is favourably noted that she sets out the objectives for each lecture on handouts and provides a structure on the board. It is acknowledged that she structures her material well. The content is always relevant and she emphasises points. There is a logical argument, she is critical and stimulates questions of academic theory and methodology. She is really interested in her subject which makes it more interesting to listen to and her enthusiasm is contagious. She encourages an "academic environment thus leading into critical analysis of the subject". Part of this is that she always supplies a bibliography. She establishes an environment in which the subject can be explored.

She is interested in students as individuals, always willing to assist with problems or questions related to the subject. She is objective and understanding during periods of tension in discussions.

Comments made by students included:

> She uses clear and easily understood terms and concepts to put her point across. She presents information in a logical, and well researched authoritative manner. She is also enthusiastic in her approach. Indeed, I found myself attending more lectures than I probably would have, under normal standards.
>
> Very methodical and clear in her approach to teaching - lots of explanations of complex theories that seem to be well thought out to make the student understand. Has a very personal style that makes communication easier.
>
> Well organised lecturing style; knowledge of subject good; presented perspective and problems of studying women in politics; raised problems with study of subject as well as virtues; overall presentation of subject well balanced, informative and thought provoking.

B explained when asked about her lecturing technique that in her lecturing she tries to preserve an informal style. She treats students as colleagues, e.g. she gives them references of the materials she used for her lecture. She does not present straight information but critically examines concepts and theories so that they can interact with student reading.

In her tutorials students were particularly appreciative of the organisation of class sessions, the clarity of objectives for each session and of explanations given. All students agreed that she stimulated their interest in the subject, made assessment requirements clear, was well prepared and provided enough opportunities to ask questions. Among the feedback items the lecturer's willingness to assist was highly rated, and it was acknowledged that workload, reading, and assignments and use of class time were appropriate. The lecturer seemed to welcome student feedback, and students felt that they had learned to think critically, to work independently, to feel responsible for their own learning and that the lecturer made them feel a valuable member of the class.

Students commented, again, on her approachability, her willingness to help and her interest in students' ideas and problems. She was not seen as intimidating or condescending, an experience which students obviously value. Students appreciated that she explained the objectives of the course clearly, made the material easy to understand, that she emphasised individual opinions rather than regurgitation of reading, and was willing and able to stimulate discussion. She used current day examples to illustrate general themes of the course and introduced interesting aspects into discussions. The tutorial groups feel at ease and thus discussion flows and is seen as valuable.

Her assessment procedures were appreciated, she encouraged independent and individual approaches to assignments and returned the work promptly with constructive feedback.

A student comment makes clear how her strengths as university teacher contribute to student learning:

> 1. Genuine informality with both lecture and tutorial
> 2. An air of expecting the student to come up with intelligent comment, thus there is a stronger motivation to do required reading, be prepared etc.
> 3. A willingness to discuss any aspect of assignment work that will help the student stay on the track, think, use the right references

4. Availability and approachability
5. A personal attitude - a lecturer who says (and behaves in a manner suggestive of a belief) that sometimes students will come up with better theories, ideas, etc. than the lecturer, makes the student want to at least try - THUS
6. Motivational of students.

In an interview she explained that she gives students options in how the tutorials might be structured. In some sessions she would draw attention to research or issues from assigned reading and would try to relate the understanding students have achieved to their own research projects. She tries to convey the feeling that they are all together in the learning experience. She thinks she conveys a feeling to students that she values them (which student comments confirm). Although this is her personal style, she also uses it as a strategy by deliberately talking to students as colleagues, e.g. sharing with them research results. She breaks up larger groups into subgroups to stimulate discussion whenever the group is not working well. She gives marks for tutorial participation and informs students of her system of allocating marks.

C - Lectures and Studio in Regional and Town Planning

C joined the Department of Regional and Town Planning in 1981 as Senior Lecturer after 20 years of work outside the education system. His orientation is more towards teaching than towards research, reinforced by very positive student feedback. He has evaluated his teaching regularly and acted on the feedback received. He teaches first, second, and third year undergraduate and also postgraduate classes employing lecturing technique and studio work. The number of students involved is usually relatively small (about a dozen).

Students commented on his articulate and interesting presentation of course materials, on his wide and deep knowledge of subject matter; in the postgraduate course on his well researched presentation, good use of audiovisual resources, good subject information. Students at all levels praised his attitude to students; he is helpful, friendly and shows real concern for students.

He provides students with course objectives, annotated reading lists, details and purpose of assessment, as well as the teaching methods chosen and the rationale for it. In several subjects he promotes student reading by requiring them to compile a workbook, which is assessed. While this increases the workload considerably, students appreciated the purpose and effect of it - increased learning and understanding.

One student commented:

> He has each session well prepared and knows the subject matter well. I always felt free to ask questions and comment during the sessions. He uses a variety of mediums, e.g. slides, practical exercises, walks etc. which are all effective. He is open to suggested changes as was brought out during the revisal of the whole course format. He was the only person to make a genuine response to suggestions. Even before this he gave a course outline which is extremely helpful to students. For this I commend him. Assessment (i.e. workbook) is very demanding but he has wisely chosen this form because it requires that we actually know and understand the material and have a resource to refer to.

Generally, students were more motivated to work harder than in many other courses.

In his studio classes the sessions are run as practical tutorials by himself and/or a tutor. In his outline he describes it:

> Mostly this takes the form of one-to-one discussions with individual students in turn, with some group tutoring or discussion as appropriate. The aim is to help you develop your ideas and skills by encouragement of strengths, and constructive criticism of weaknesses. While some of the teaching can be done in a scheduled and predictable manner, much of it will occur spontaneously as individual or common problems arise. Therefore students will benefit from this form of tutoring and group learning only if they attend regularly and for the whole studio session.

Students rated highly his knowledge, and more so the way he relates to students and helps them in their work. Responses to feedback items on the questionnaire showed that students in the highly evaluated courses felt that they had developed the ability to solve problems in this field, had learned to feel responsible for their own learning, and that the lecturer had linked material in this class to activities in other classes, had chosen studio projects well for developing practical skills, and that the lecturer demonstrated how the work should be tackled. He shared studio tutoring equally amongst students.

One example of a student comment is:

> Organisation - excellent. Willingness to give assistance, objective comments, to answer questions. Gives sufficient encouragement to balance criticism. Is willing to maintain a good working environment for students, i.e. likes to see students happy. Makes use of students' feedback. Quality of lectures is far greater than others in the department.

D - Clinical Work in Surgery

D takes fifth year medical students for an eight-week intensive program of clinical surgery, including outpatient clinics, ward rounds, seminar and tutorials. He is a Senior Lecturer, about 40 and has been teaching at the University of Queensland for five years.

The subject itself was rated 5.1, only slightly above average, whereas D's teaching was rated by the 10 students in his group uniformly highly. He received a mean rating of 6.4. Dr D had chosen feedback items from the item bank which related mainly to his own attitude towards students. The ratings showed that students considered him very professional, open to student opinion, courteous towards students, and enthusiastic and competent in the subject.

Students commented on Dr D's strengths in much the same way: his professionalism, his interest in teaching the students, his attitude towards students and patients, his knowledge and ability to explain all received favourable comments.

Student comments provide an idea of his approach to teaching in loco:

> He is articulate and has a down to earth and effective method of both explanation and teaching. The material covered in ward round sessions was relevant to common surgical conditions and will have prepared me well for next year's surgery term. An easy man to relate to and approach about any problems as regards the course. His outpatients sessions were invaluable.

> He is the best teacher/tutor I have encountered in my university life. His knowledge of surgery is extensive and he can relate this knowledge to students. He makes you feel welcome in the theatre, keeps the frustrated theatre sisters off our backs and takes time to teach during operations. He has a good attitude to students (treats them as people) and has a personality which allows discussions on outside subjects as well. It is more conducive to the learning process if the teacher is not high on a pedestal but among students.
>
> He presents an excellent professional attitude which encourages respect for his skills and profession. He is punctual and always attends appointed teaching rounds (which is not always the case with all consultants). Students greatly appreciate these factors. He is always willing to answer questions and discuss any topics students request. He illustrates topics with cases and draws diagrams to help the students understand points of technique and procedure. He is willing to let students see cases and present them in Outpatients. This is regarded as invaluable experience for us. He is always willing to allow students in the theatre to see and assist where possible. He is always considerate enough to explain points of technique and to ensure that students can see adequately. This contributes much to enthusiasm for the subject.

E - Practical Work in Dentistry

E is a temporary lecturer in Restorative Dentistry; she is in her mid-twenties, and has only been teaching for 18 months. She is engaged mostly in teaching, though her orientation is towards a balance of teaching and research. The classes where her teaching was evaluated were two final year courses in Operative Dentistry. The description in the 1983 University of Queensland Calendar reads:

> Lectures and related clinical work to achieve competence in more complex operative dental procedures and unusual cases. Increased emphasis made on complete care and continuing treatment of patients.

There are 11 students in each of the two practical classes she takes. Each group meets for one morning and one afternoon, a total of six hours each. Students rated the subject as 5.2 and 5.3 respectively, and in both groups she achieved an average overall effectiveness rating of 6.0.

On the standard questionnaire items she rated particularly well on the clarity of her explanations, her own preparation for classes; her willingness to offer individual help and to provide opportunities to ask questions. She chose the following items for feedback, and received high ratings on all of them:

The lecturer is professional in attitude.
The lecturer is available for consultation.
The lecturer is courteous towards students.
I have learned to think critically.
I have learned to work independently.
I have developed skills needed by professionals in the field.
I have developed the ability to solve problems in this field.
I learned to feel responsible for my own learning.
The lecturer stimulated me to follow up points that are raised.
The lecturer points out links to other subjects.
The lecturer suggests specific ways students can improve.
The lecturer sets high standards.

The items chosen seem very appropriate in a final year professional course. The comments confirm that she has prepared students adequately and served herself as a positive role model. All but one student responded to the question, "What are this staff member's strengths in teaching?" Most often her attitude towards students was praised (15 mentions), that she was very open, ready to listen, polite, pleasant, not sarcastic, good tempered and professional in attitude, not condescending. Nearly equally often students mentioned that she was very approachable about any problems arising in the course, that she was helpful and willing to spend time with students. She communicates at the same level with students, she understands the limitations existing for students in the specific learning situation.

Her mastery of the subject knowledge and skills was acknowledged, the sound practical advice she gave, and the way she helped students when a problem arose. She explains well the principles behind the techniques used, she explains what should be done and how. She helped students 'in trouble' without taking over, she was efficient in her assessment of clinical problems. She took time and care when looking at a patient. She was fair in criticism of students' work and able to look at both sides of a situation. Her attitude to patients was mentioned, too; she showed interest in the patient's well-being and took time and care when looking at them.

Two student comments sum it up:

> She is the most helpful demonstrator I have had because:
> 1. gives sound advice
> 2. will answer any question raised
> 3. will help practically when in trouble but does not 'take over' completely
> 4. pleasant personality
> 5. not condescending.
>
> She is always helpful, and always spends time and care when explaining or looking at a patient. Always gives helpful advice, and any criticisms are constructive. Always there when needed. Treats students as individuals and doesn't talk down to us.

F - Tutorial in English

F is a Teaching Fellow in the Department of English, doing a few hours of part-time tutoring while pursuing a higher degree. He is in his end-fifties and in his first year of university teaching.

The subject where his teaching was evaluated is a first year subject called 'Writing and Style'. According to the departmental handbook,

> This course concentrates on written communication. Students meet in small groups for three hours per week to discuss non-fictional writings on a wide range of subjects, e.g. history, manners, morals, philosophy, art, language, etc. An important aspect of the course is its practical writing programme through which students are able to compare their own writings with those of their colleagues as well as those of the professional writers they study.

F took an evening tutorial group; this normally means that students are mature age, coming to university after a gap in their education. Often this subject is recommended by student counsellors to students unsure of their writing skills. The 13 students rated the subject very highly (6.0) and the teaching even higher (6.3). The tutor was rated consistently highly on all standard items. The feedback items chosen reflect aims of tutorials: students thought they had learnt to think critically, had learnt to apply principles from this class to new situations, had learned to discuss. Interaction had been encouraged. They had developed an interest in this subject, a subject which stretched their mind.

Most often students commented on the climate F was able to create in the tutorial - he made students welcome and comfortable, he was supportive and had rapport with them. As one student expressed it: "He has finely honed teaching skills, he is socially aware of how students feel and adapts his teaching appropriately." He is seen as personable, patient, tolerant, with a sense of humour, and displays an unbiased attitude. He encourages discussion in the group.

But students also commented that he had a good knowledge of the subject and other areas, like History; that he was interested in the subject, was conscientious and well prepared. Students perceived his grading of their assignments as fair and commented that he gave encouraging feedback on assignments.

DISCUSSION

What do the case studies tell us about teaching effectiveness and 'superior' teaching? Are they an illustration of what the literature call effective teachers or do they suggest different characteristics and criteria?

There is considerable literature on criteria for teaching effectiveness (Grasha 1977). Without discussing the alternatives, I affirm the established validity and reliability of student perception of effective teaching as measured by student evaluation of teaching. Eble (1970, p. 9) quotes the following equation,

$$C_1+C_2+C_3+C_4 = \text{Effective Teaching}$$

with C_1 being Competency, C_2 Concern or Compassion, C_3 Commitment, and C_4 Enthusiasm. He cites another study which found knowledge, organisation of subject matter, skill in instruction and personal qualities to be determinants of effective teaching. Marsh et. al. (1975) noted that the following evaluation factors had the highest validity coefficients: those relating to course organisation, instructor presentation, and student growth. Instructor involvement/enthusiasm, instructor accessibility and workload/difficulty of the course had the lowest.

Our own data suggest similar factors. "Overall effectiveness as a university teacher" correlated highly with the following standard items on the questionnaire:

> Class sessions were organised to ensure maximum learning.
> The lecturer's explanations were clear.
> The lecturer stimulated my interest in the subject.
> The lecturer motivated me to work hard.

In the last evaluation round (Semester 2, 1983) staff chose most often the following items from the item bank (in descending order):

I have developed interest in the subject.
I have gained a good understanding of the field.
The lecturer presents material in an interesting way.
The lecturer seems to know the subject matter well.
The lecturer is approachable.

The items chosen most often by staff express similar ideas to some of the standard items. Both motivation and stimulation of interest are complex processes in teaching and learning. Staff tend to be 'unsure' in their self-evaluations whether they achieve this, and students tend to be 'unsure' whether the lecturer was successful in achieving this. That might explain the tendency for staff to seek more feedback in this area.

Other items from the item bank which correlated highly with the overall effectiveness rating were in Semester 2, 1983:

The lecturer is courteous towards students.
The lecturer made me feel a valuable member of the class.
The lecturer stretches my mind.
The lecturer uses class time well.

The first three of these latter items seem to have been chosen for small tutorial groups, each involving only a relatively small number of students.

Overall, both staff and students seem to agree on the importance of staff's

- Organisation of class sessions and subject material
- Clarity in presenting material
- Presentation of material in an interesting way which arouses interest in the subject
- Positive attitude towards students.

The importance of the question, "What are this staff member's strengths in teaching" lies in providing the context-specific characteristics and strategies.

Falk and Dow (1971, p. 6) in their discussion of criteria of effective teaching talk about teaching to, which is the "teaching of norms of intellectual behaviour, e.g. to reason critically", teaching that which is "conveying a fact", and teaching how, "helping the student cultivate a skill". This is a useful distinction for interpreting the student comments on teacher strengths.

A (and C in his lectures) seems to be predominantly engaged in "teaching that"; he is providing information, a knowledge base which students need in order to do their practical work. His teaching aims, imparting knowledge, can be, according to the literature (Dunkin 1983) effectively and efficiently achieved through lecturing. Other highly rated staff who were teaching large classes and had similar aims, share the following strengths with A:

- Competence, i.e. wide and deep subject knowledge
- Good preparation for, organisation and structure of presentation
- Clear, concise delivery which enables students to take notes
- Interesting presentation of subject material with examples, illustrations, audiovisuals where appropriate
- Approachability and willingness to help.

Advice which one might give to staff lecturing to large classes and teaching mainly facts is, in the light of students' comments: "Know your subject matter thoroughly; organise and structure it so that students can follow; if possible, draw on experiences and examples from your own professional practice; use plenty of examples and illustrations and supplement with quality audiovisual resources and helpful handouts. Speak slowly and clearly to allow time for student note-taking. If possible, relate the lecture material to the practical side of the course or the professional practice, i.e. make it relevant. While it is most important in large classes which do not allow much student feedback and questions to present the material well organised, also make it interesting to keep student attention and stimulate student interest in the subject. Although relationships with students cannot be close when large numbers of students are involved, each student will want to have the feeling that you are available for help outside classes. Your concern for students and student learning can be demonstrated by your willingness to answer student questions inside and outside class and by treating them with patience and respect." Much of what the well researched books by experts on teaching (Bligh 1971, McKeachie 1978) say confirms the validity of the student comments at this University.

Lecturing in a Social Sciences course, and conducting complementary tutorials is different from A's teaching situation. B was not primarily "teaching that" but "teaching to" - to think critically, to apply concepts, to examine theories and methodology, to become independent learners. The informal lecture format she uses and the concept-centred approach to lecturing provides a model for critical examination and evaluation which students then can practise themselves in tutorials. In such a more interactive teaching situation, personal qualities and interpersonal skills assume a greater importance than in formal lectures, without diminishing the importance of either subject knowledge or clarity of presentation. These qualities and interpersonal skills are needed to convey to students that contributions, questions, criticisms are welcome. This comes through strongly also in student comments on F's strengths who is teaching first year evening students. His interpersonal skills enable him to create a classroom environment which is supportive and encourages and allows students to venture into expressing ideas, and to show them how to accept feedback.

C and E are primarily "teaching how", one in studio work, the other in a clinic. Ability and willingness to give practical assistance and constructive feedback were valued highly. In those classes where skills have to be learned and mastered for a professional career the lecturer becomes a role model as professional. This is also demonstrated by comments on D in his approach to teaching an intensive surgery course. Students respond to the professionalism of the staff members.

This does not include only subject competence and ability to communicate the knowledge, but also appropriate conduct as a professional, be it patience and respect towards patients or acceptance of criticism and scientific rigour. Although students commented favourably on these staff members' personality, other staff who were professional but not 'personable' still received high ratings on all aspects of their teaching.

The equation mentioned above could be slightly modified in the light of our experience:

Effective Teaching = Competence in subject matter + Communication skills + Commitment to facilitating student learning + Concern for individual students.

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CONCLUSIONS

Staff who participated in the student evaluations of their teaching did this voluntarily. They initiated the evaluation and the use they make of it is up to them. They can ignore the student responses, can act on suggestions made, they can submit the results to reappointment and promotions committees.

We have looked here at some staff who were rated by students as superior. Although on the whole there had been a fairly strong correlation between subject and overall effectiveness rating, among the sample here were staff who taught subjects which were both compulsory and rated well below their teaching. In the above equation another "C" is missing, the Constraints put onto the individual. Staff members in different departments and teaching at different levels have different degrees of autonomy in selecting and structuring course content, organising the course, and selecting teaching strategies. Those who are scheduled to lecture to large classes are usually not free to experiment with alternatives, e.g. they cannot substitute lectures by guided reading or videos, because contact time is required and because it is not possible to replace a two-hour lecture - contact between one lecturer and up to 200 students - by individual consultations after students have read or seen the materials. Staff who are in charge of a course and do lecturing and tutorials or practical sessions in it often have considerably more freedom and opportunity in organising class time in such a way as to increase interaction with students and opportunities for active learning. Staff who tutor for other people are teaching in a context planned by other people; but while the type of activities to be done in tutorials is usually specified, e.g. discussing student assignments, problem solving, case study discussion, there is scope for introducing different small group teaching strategies.

Students clearly appreciated that C had restructured the course and introduced new elements, like different assessment. Although students can only evaluate some aspects of teaching, their judgment of 'superior' teachers would not be contested by many. But there would be, no doubt, other staff whose strengths are not in classroom presentation but in communicating in writing, e.g. writing course materials as in distance education courses, or textbooks, creating audiovisual resources, developing new or redeveloping old courses. These aspects of teaching can be commented on, of course, by colleagues.

There are still teaching staff who claim "The best sort of lecturers are the incompetent ones, because it means students will have to go out and learn for themselves", but the Postgraduate Student Representative on the Academic Board of the University of Queensland recently poured scorn over this attitude in the student newspaper Semper (4, May 3, 1984, p. 9). Resources are scarce in the University, including staff and student time; students seem to endorse Scriven's definition (1981, p. 248), "Teachers are meritorious to the extent that they exert the maximum possible influence toward beneficial learning on the part of their students."

Within the constraints of their courses and judged by what students experienced, the best sort of lecturers are those who share their knowledge and skills and also encourage students to go out and learn for themselves when it is appropriate in their and their students' view.

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A MODEL FOR A COMPREHENSIVE APPROACH TO THE EVALUATION OF TEACHING EFFECTIVENESS

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Macquarie University.

INTRODUCTION

The evaluation of teaching performance within academic communities has attracted increasing attention over the past few decades. Australia lags behind many other countries, especially the United States and Canada, in this regard. However, since the late seventies, a growing number of institutions within Australia have implemented teaching evaluation procedures.

The report of the Australian Vice-Chancellor's Committee (1981) on the development of academic staff drew attention to the importance of evaluating teaching. The report states that evaluation has a threefold function in that it provides feedback to the lecturer, it provides the institution with regular reports for use in personnel decisions and, if the results are published, it provides students with guidance in their selection of subjects and courses.

With this background, Macquarie University supported the secondment of a member of the School of Economic and Financial Studies to Staff Development for 2nd semester, 1983. The purpose was to develop a procedure for evaluating teaching effectiveness. The researcher had commenced her career as a high school teacher and had subsequently spent eight years with Sydney University's Teacher Development Program as a Part-Time Lecturer in education.

AIM, SCOPE AND NATURE OF THE EVALUATION PROJECT

The basic aim of the project was to heighten awareness about teaching and then to lead to an improvement in the quality of performance. The need for professional self-development is supported by Karmel (1983) who maintains that "the values of academe insist on a continuous process of assessment, testing and improvement of what we do as individual scholars and researchers".

Evaluation of teaching has occurred in the past but it has been subjective and randomly conducted. According to the Tertiary Education Unit, University of Queensland (1979), given that "any measure of teaching is bound to be imperfect, defined and systematic measures are preferable to ad hoc, unsystematic measures".

With this view in mind, the aim was to develop a procedure of evaluation which was comprehensive, flexible and impartial. The procedure was to be practical and was to contain, if possible, the three basic elements of self, student and peer appraisal. In the prevailing political climate which was characterised by a mixture of unease, fear of the way the results might be used, and qualified support, the researcher opted for a consultative approach.

After some preliminary ground work, a stratified random sample of 16 staff was selected from within the School. The sample was weighted towards the larger discipline of economics. The nature of the project was voluntary and twelve people elected not to participate. A second random selection added three more. The remaining half of the final sample (of 14) consisted of staff, who on approach, agreed to participate in the study.

Due to the process of acquisition, the sample is not seen as representative of the School. Thus the study is using the anthropological or small group approach. Moreover, the selection process demonstrated the extreme caution with which this type of exercise has to be approached.

The 'voluntary' nature of this pilot study largely eliminated the problem of unwilling participation which confronts many evaluators. However there was still evidence of fears and an element of resistance to the concept of evaluation. The prevalence of these attitudes reinforced the need to use a consultative approach, where control over the nature of the procedure adopted rests with the group. Roe (1982) stresses the importance of "the rights of the evaluated to be kept fully in the picture; to have their feelings respected; and, wherever possible, it is recommended that there should be some kind of formal contract between evaluator and evaluatee, specifying the dimensions of the project." Even though the nature of this project was exploratory, there was an informal contract devised for each participant.

Moreover, given the difficulties of creating a favourable climate, the basic aim of the project was stressed as being to lead to an imporvement in teaching. As Roe (1982) predicted, "an evaluative study must deny any summative and may even have to soft-pedal its formative purposes".

The group decided to devise measures which would describe their teaching performance and identify issues for discussion. In this process many issues were raised relating to the educational philosophy within a University, the containment of teaching methods by resource constraints, the distribution of responsibility with regard to learning and, not least of all, the problem of defining 'good' teaching.

Overall, the attitude of the group was one of not wanting to pass judgments and of implying rather than stating possibilities for improved teaching. This view is supported by Roe (1982) who says that it "can be argued that in evaluating the operations of responsible, professional people, this is the right and proper way to proceed, and that they can be left free to draw their own conclusions". Given this situation, the group wanted to rely almost totally on student evaluations. Self-evaluation was initially seen as being of little value while peer evaluation was viewed as politically untenable.

While these feelings were noted, the researcher undertook to try and sway the group towards a more comprehensive approach to evaluation. The advantages of critical self-assessment were stressed and the use of workshops for this aspect was promoted. Secondly, an attempt was made to assuage the fears of the group regarding peer evaluation. The concept of mutual respect was discussed as was and the importance of undertaking peer evaluation in an atmosphere of impartiality, reasonableness and trust.

PROCEDURES ADOPTED

In view of the serious resource limitations within the School of Economic and Financial Studies, and the time constraints under which the group operated, it was decided that:

(1) the method/s of evaluation for each individual would be flexible and be chosen by the individual.

(2) he/she was responsible for selecting the course/s to be subjected to evaluation.

(3) self appraisal was to be by means of a questionnaire form (Form A).

(4) two student questionnaire forms were to be developed for feedback purposes. Form B (with variations) was to be applied by lecturers and Form C by tutors. These questionnaires were to be completed in the 10th or 11th week of semester.

(5) the modified version of the Western Australian Institute of Technology questionnaire (Form D), for evaluation purposes, was to be trialled for the University in the 12th week of semester (see Appendix).

(6) peer evaluation (using Form E) was to be undertaken on a voluntary basis in 11th-13th week of semester.

(7) a final meeting to evaluate the procedures and to discuss recommendations was to be scheduled for the end of the semester.

RESULTS

The sample, as previously stated, was not representative. Nevertheless, it contained academic staff at all levels - three professors, eight lecturers and three tutors. The feedback on the various procedures was valuable and insightful.

(A) Self-Evaluation was undertaken in full by two people in the sample. This was useful as it enabled a comparison between the students' median scores and the instructor's perceptions on each question in form B or C. Three other people completed parts A and B of form A.

This aspect of the evaluation emphasised the importance of keeping a "teaching dossier", and of allowing provision for the statement of one's educational philosophy and the amount of autonomy avaiable to the instructor within each course.

(B) Student Appraisal - Each of the 13 instructors who participated was supplied with a computer printout showing the mean, median, standard deviation and frequency distribution on each question of Forms B, C and D. The data were entered and analysed by a research assistant, for both speed and privacy purposes. The median scores on each question were compiled into three tables in order that individuals might compare their scores with the group norms.

Forms B and C were seen as useful, though the general feeling was that instructors anticipated the results fairly accurately. However, the feedback was seen as valuable, especially the responses to the opened-ended questions. Some disquiet was voiced about whether students took the exercise seriously.

Most instructors felt that they did, but stressed both the importance of adequate explanation of the purpose of the questionnaire and the return of completed forms in a manner which negated any possibility of interference with results.

Form D (for evaluation) was generally less favourably received, and criticisms of it related to bad questionnaire design, the lack of a meaningful scale and the inappropriateness of two questions. Questions four and five were both poorly received.

All instructors scored lowest on question four which concerned feedback in the course. There are difficulties with the interpretations of the question, and what is actually regarded as feedback. Moreover, a number of instructors evaluated were running large courses with over 100 students and they frequently found it difficult to provide adequate feedback. Lectures were sometimes taped and relayed to adjoining rooms, which prevented the obtaining of feedback within the teaching context. In addition, the lack of adequate resources, in the form of computer-based assignments and scanning equipment for marking, has militated against the use of regular marked assignments.

Question five, concerned with responsiveness, also posed a number of problems. The wording was not seen as appropriate and some felt that this was not a relevant question to ask of university students. The same criticism applied to question four and, overall, the feeling was that the questionnaire, which was designed for the educational philosophy of an Institute of Technology, was not necessarily applicable in a University setting.

Finally, the response to Form D was that instructors should only be evaluated on what they were responsible for. When the University implements the use of this form of student evaluation, it should be on a voluntary basis. Moreover, instructors should be free to choose whether the results remain private or are used in support of promotion/tenure applications. Failure to submit the results should not be taken to imply poor teaching performance.

These qualifications highlight the apprehension of the group in the use of student evaluation results to determine employment decisions. Overall, the feeling of the group was that student questionnaires should be adaptable to suit the needs of individuals, they should be administered at various levels, and over different courses and semesters. There should also be some provision for surveying students after the completion of examinations.

(C) Peer evaluation was preceded by a seminar run by the Staff Development Officer on "Non-judgmental Observation". This emphasised the features of good communication and the need to be aware of different personality styles in teaching. Ten out of the fourteen people were evaluated by at least two people, in all but one case. There were two paired arrangements, that is colleagues evaluated each other, with additional input from at least one other person. In the remaining six cases, the evaluation was done by members of the sample, the researcher and other members of the School. The aim was to have at least two evaluators from the discipline of each person being evaluated. The results were provided to the instructor either directly (orally or written) or as a joint report.

The surprising outcome was that peer evaluation was seen as the most valuable aspect of the evaluation procedure. All but two of the ten people agreed to classroom observation, in spite of their anxiety, and many sought honest feedback. In some cases there was a reluctance to pass judgments or make suggestions/comments of a personal nature. This was overcome by the joint report.

In all, the peer evaluation process was viewed as most beneficial by the evaluator. Colleagues commented on how it encouraged them to analyse their own style, their use of audio-visual equipment, their course management, etc. In this regard, it is of great formative value and if introduced as a continuous process, many of the difficulties due to lack of familiarity (anxiety, lack of ease in making honest comments) should dissipate. Continuity would also eliminate problems due to inappropriate courses for peer evaluation in some semesters (e.g. honours class), and would enable a profile to be developed over a series of lectures or courses.

Some degree of training is necessary if peer evaluation is to be undertaken by all instructors. However, the advantages in impartiality and fairness of using all instructors outweigh the disadvantages of delegating this aspect of evaluation to Heads of Discipline or Head of School.

PARTICIPANTS' EVALUATION OF THE PROJECT

Individuals were asked to comment briefly on their perceptions of the project. A selection of these comments follows:

Person 1

Overall the exercise seems to have been worthwhile and all the worry about the methodology of evaluation may have been due to the fact that it was a new and unusual experience, both for the observer and the observed. However, some thought must be given to ways of improving or even developing observer skills. Also the questionnaires need to be refined and moulded to specific subject areas and teaching modes, so that they can measure those aspects of the course and its presentation that are under the teacher's control.

Consideration must also be given to the effect on morale and confidence of persons receiving particularly adverse reports so that these can be used in a positive and constructive way.

Person 2

I found the exercise rewarding of my time and emotions. The insight I most value came from comments by my colleagues, although I felt less spontaneous and confident and more anxious than usual while they were observing me. I feel I benefitted from observing another teacher in action and comparing experiences.

I was curious to know the responses to the detailed student questionnaires, although I believe this kind of feedback cannot really be understood by someone who is unaware of the unique characteristics of the group of students in question. The differences in responses from the students in two of my classes simply reflected different constraints (numbers, rooms, prior knowledge, texts, human resources, etc.) and the particular "chemistry" in each group.

I feel quite unenlightened in any way by the responses to the short student questionnaires (Form D), which I believe simply wasted fifteen valuable minutes of lecture time.

Person 3

I found participating in the teaching evaluation project an interesting and rewarding exercise. Its implementation seemed to me to reveal some deficiencies in the actual questionnaire but even so the results were useful feedback. I also found the discussion among participating staff members to be thought-provoking and encouraging.

Person 4

I support the aims of the project, i.e. to develop a method for assessing teaching effectiveness. Although I was unable to participate in the peer evaluation, I personally would have appreciated the opportunity for feedback from other staff members. I was influenced in this opinion by the positive reaction of those who did participate.

I believe the student questionnaire (Form B) to have been worthwhile. Students appeared to react quite positively to some of the more detailed questions on aspects of teaching performance - tone of voice, degree of enthusiasm, etc. This suggests to me that students saw this questionnaire as worthwhile and highly relevant.

I had an aversion to the short six-aspect evaluation (Form D) as I did not feel that it was sufficiently comprehensive. I would like to participate in this procedure if formalised in the future, but I would like to see the inclusion of a component that evaluates the course after the completion of examinations and marking. At this time students feel freer to make comments and they have a better perspective on the overall course.

Person 5

I have been impressed by the outcome of the evaluation study. It has gained a great deal more co-operation from staff, and has yielded a wider range of results, than I would have predicted. In my opinion the conclusions to be drawn at this stage (and some of them differ from what might have been expected) provide a sound basis for the development of policy in this area. I would like to see more work done now on the instruments used. I believe they need refining and further testing before they could be confidently implemented on a wide scale. I hope this work can be carried further.

Summary of Participants' Comments

In all, it appears that the exercise was viewed favourably though there is need for an appreciation of the difficulties surrounding evaluation. As with other evaluation projects, many gains accrued during the implementation of the evaluation procedure rather than after the completion of the process. That is, evaluation projects that adopt a 'client-based' approach lead to continuous development rather than to changes at the end of the process.

DISCUSSION AND CONCLUSIONS

The most notable change within the group was from that of distrust and unease, for some, to co-operation and mutual advantage. As Roe (1982) maintains, "we should learn to overcome our fears and resistance" and not resist systematic attempts at evaluation.

The advantage of the small group, consultative approach was that people participated at all stages of the decision-making and had a chance to discuss their feelings. By steering the group, the researcher was able to encourage the group to become more courageous about evaluation. The group concluded that objective evaluation procedures should be used in promotion/tenure decisions, though this is secondary to the formative purposes of evaluation. But they suggested as a proviso that the evaluation techniques be trialled for two to three years before the results be regarded as reliable and valid for use by the University in personnel decisions.

The sample largely comprised people who were very concerned about the quality of teaching within the University. This was evident in the sample selection process, and the colleague evaluations supported this position. The problem remains of how to transfer some of the insights gained from this small group study to the wider University community. A number of suggestions to assist in this procedure were included in the report to the Deputy Vice-Chancellor.

While the instruments for student evaluation need refinement, the aspect of peer evaluation needs most attention and research in the future. This project considerd only undergraduate teaching (except in one case). Peer evaluation must be extended to cover all teaching, scholarly productivity, administration and community activities. The major criteria for improving colleague evaluations have been identified by the study as:

(1) reliability - one should not rely on Head of School's judgment alone as it may be due to specific factors of age, sex, teaching field, etc.

(2) validity - cross check by using a number of people - a minimum of two.

(3) predictability - performance may vary from time to time and over different courses.

(4) continuity - need for continuous evaluation over a minimum of two years.

(5) accountability - be aware of the domain of the "evaluatee".

Further research needs to be done on the development of adequate instruments for use in peer evaluations (Batista 1976), the division of labour surrounding peer assessment, and the possible establishment of a committee within each School to carry out peer evaluation. Such a committee should incorporate both faculty and student members, and should be responsible for determining the range of satisfactory minimum performance at each level within the School. Ultimately, peer evaluation results might be used as an incentive scheme in relation to salary.

In conclusion, the group felt that evaluation, especially peer evaluation, was worthwhile. It led to self-development and a potential restoration of the balance between the importance of teaching and research in promotion/tenure/outside employment decisions. Hildebrand et al (1971) similarly maintain that it is "highly probable that if teaching were to become a more effective criterion for academic advancement, performance would improve". Academic freedom, and latitude for exemplary, non-conformist teachers should not be compromised if participation occurs in an informal, unbiased fashion.

Finally, I agree with Scheck (1979) that some attempt should be made to ascertian "the link between teaching behaviours and student learning outcomes, as ultimately that is what teaching effectiveness is all about". One way to assess teaching would be to consider it excellent in proportion to its constructive contribution to the life of the learner.

ACKNOWLEDGEMENTS

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APPENDIX

MACQUARIE UNIVERSITY

(D)

STUDENT APPRAISAL OF TEACHING
SCHOOL OF ECONOMIC AND FINANCIAL STUDIES -1983

PURPOSE

This questionnaire is to be used to review the effectiveness of your instructor's teaching.

INSTRUCTOR'S NAME...................................

COURSE ....

ENROLMENT .... FULL/PART TIME

DIRECTIONS

1. Fill in the details at the top.
2. Rate your instructor on the six aspects listed by circling the appropriate number.
   Note: The highest rating (5) would mean an outstanding performance by the instructor.

Important: Before rating your instructor familiarise yourself with the meaning of each of the six aspects on the separate sheet.

YOUR THOUGHTFUL CO-OPERATION IS APPRECIATED

ASPECT	LOWEST RATING				HIGHEST RATING
1. With this instructor, I know what I'm supposed to be doing.	1	2	3	4	5
2. The instructor is a good organiser	1	2	3	4	5
3. This instructor really gets the message across.	1	2	3	4	5
4. This instructor keeps me in the picture about how I'm going	1	2	3	4	5
5. This instructor shows a genuine concern for students	1	2	3	4	5
6. This instructor compared with others	1	2	3	4	5

FURTHER COMMENTS:

7. What aspects of this instructor's teaching are especially good?

8. What suggestions do you have for improvement?

A REVIEW OF A FIRST YEAR COMPUTER PROGRAMMING COURSE

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INTRODUCTION

In this paper, we report a study of the first programming course in the sequence of computer science courses at the University of Sydney. The full three years of Computer Science can be part of a Pass degree that is professionally accredited. Students can continue their computing studies with a fourth, Honours year and then higher degrees. The study was motivated by a number of issues discussed below.

Most computer science courses have been subject to two main sources of change. Firstly the discipline is young and changing rapidly and secondly class sizes have grown very quickly. Not surprisingly, computing courses tend to be subject to continuous changes. The need to review existing courses is pressing.

Computer science is still rapidly evolving. The steady improvement in the technology has made new endeavours possible and created myriad problems to be tackled. The programming component of computing courses has changed markedly even in the past ten years. Whilst part of this is due to the availability of better technology and tools, there have been more fundamental shifts in accepted wisdom of what should be taught and particularly, what should be taught first and how (Gries, 1981). One axis of contention in what to teach is concerned with conflicts between the need to train programmers in areas that are currently in demand and to educate students in what are deemed to be more fundamental concepts that can be the basis for the long term use of the technology.

The conflict between training and education arises in several other ways. The one that is most relevant to this study is due to the difficulty in teaching two very diverse groups of students. The course has to serve the students who will go on to major in Computer Science and become qualified as programmers. At the same time it has to serve students who want to learn a little about computers to get a rounded (more liberal) education.

Growth in class size forces significant changes in the teaching methods. The enrolment in the first programming course at the Basser Department of Computer Science grew from about 300 in 1976 to about 800 in 1980 and has remained at that level. The rapid growth of interest in tertiary level computing studies can be attributed to several factors:

- employment prospects in the computer industry are relatively good;
- it is a new discipline with growing acceptance as an area of study in its own right;
- increasingly wide availability of computers has increased interest in computing studies at all levels from "computer literacy" to training and computer science; and
- as yet there is no established study of the subject at secondary level or elsewhere though there are many courses of very uneven level available at a range of places.

Unfortunately for students, interest in computing grew at just the wrong time. Government cutbacks have hit universities just ahead of growing enrolments in computing courses. This and the world-wide shortage of people with higher degrees in Computer Science has created staff shortages. In this situation, teaching becomes even more difficult.

It is likely that increased enrolments have included increasing proportions of students wanting a terminating survey course rather than a solid introduction to Computer Science. This makes for greater diversity in the class and the need to adjust teaching to cater for it. This is all the more difficult to do well as most students enter the course with very little background and hence little idea of how they will find the subject. Even more important, many students come to the course without suitable study skills and those they attempt to adapt from experience in other subjects are often inappropriate.

There is also evidence that in Computing, as in Mathematics and other technological subjects, women might underachieve and so too might other less readily identifiable groups from educationally disadvantaged backgrounds. Upon identifying a similar problem one needs to develop teaching approaches that might help overcome it.

With the rate of change in the material being taught, the methods for teaching it, the size and composition of the class, it seemed important to improve our understanding of the situation by a careful study and review of the present course. We wanted to understand the major sources of difficulty that students encountered and to assess the effects of some teaching innovations so that further developments can be well directed. It is also valuable to be able to identify the strengths of the course so that care can be taken to preserve the best of the existing system as changes continue to be made.

The study we embarked on was substantially for formative purposes. That is, we were interested mainly in improving the present course. The question that arose immediately was "how best can we study and review this course to meet our primary aim of improving the course?"

In a previous paper one of us criticised the use of laboratory controlled experiments in evaluation research, and particularly for formative purposes (Prosser, 1984). In that paper it was argued that the focus of such studies should be on the practical problems and issues encountered in the course and on the deliberative processes associated with practical decision making about improvements to the course. In order to achieve this it was argued that a review team be established containing people with knowledge of four major areas associated with a course i.e. teachers, students, subject matter and context, and that that review team conduct the study and deliberate on any changes needing to be made to the course (Schwab, 1969).

In this paper we wish to focus not so much on the review process and issues associated with that but more on the outcomes of the review. In order to do this we have divided the outcomes into three broad areas. The first of these will be the outcomes for the course, secondly the outcomes for the subject matter specialist in the review team, and finally the outcomes for the curricular specialist. That is we will describe briefly what we learnt about the course and the subsequent changes that were made to the course. We will then describe what the subject matter and curricular specialist learnt about curricular review from the study.

DESCRIPTION OF THE REVIEW PROCESS

In order to provide some context in which the outcomes of the review may be understood, it is necessary to provide a brief description of the course and the review process.

The module studied was part of the introductory term of the Computer Science 1 course. It was intended to provide students with elementary programming skills.

On completion of the course, students should have been able to devise an algorithm for simple programming tasks. They should have been able to implement simple algorithms in Pascal, making good use of all the control structures of the language, all the simple data types and one aggregate data structure, the array.

There were eighteen lectures (mainly at the rate of two per week), one two-hour lab session per week and a one-hour tutorial each week. There was also a tutor available from 1.00 to 2.00 pm each day for individual consultations with students.

Students were required to complete an average of one programming problem each week. That problem gave students practice in applying the programming principles presented in the preceding week's lectures. For all but the first few weeks there were also optional problems (called Honours) that were intended to challenge the most able students. This work was assessed by both the automatic assessment system and by manual marking (with most marks being for manual marking).

There were two practical examinations during the term one before Easter and the other in the last week of the term. The aim of these was to provide an accurate indication of each student's ability to perform a simple programming task in a fixed allotment of time. These also identified students with difficulties so that they could be offered additional tutorial assistance.

The assessment was based on the practical work, the practical examinations and the Lent Term examination.

The idea for the review grew out of work done in the previous year which focused only on the teaching process. For reasons mentioned in the introduction, it was thought appropriate to review the whole of the programming section of the first year course including the lectures, tutorials, workshops, assignments, content, student hand-out notes etc.

A review team was then established consisting of a subject matter specialist and two curricular specialists, with advice as seemed appropriate from the head of the Computer Science Department.

Initial discussions in the review team focused on identifying a preliminary set of issues and procedures for obtaining information about those issues. As the review progressed new issues emerged, and information was collected relating to those issues.

As information was collected, it was analysed and brief reports were written and distributed to members of the review team. These reports were then used as a major means of identifying emerging issues and identifying data gathering procedures. Members of the team met regularly, and usually informally, to discuss the reports and future activities.

It was during these informal discussions that ideas for changes to the course emerged and were clarified. A final report was prepared which in essence documented the findings and procedures used during the study of the major issues and the resultant recommendations for change. In the event, as the subject matter specialist was the lecturer in charge of the programming section the recommendations were actually the decisions for change already decided upon. Table 1 shows a summary of the sources of information used and the methods of collecting information.

Table 1: Sources and Methods of Collecting Information

		Sources						
	Students	Tutors	Lecturer	Lectures	Tutorials	Workshops	Written Material	Assess-ment results
Methods								
Interviews	X	X	X					
Questionnaires	X							
Observations				X	X	X		
Documentary Analysis							X	X
Video			X					

OUTCOMES FOR THE COURSE

Before considering what each of us learnt about curricular review, we wish to briefly discuss our conclusions and recommendations about the course and what has happened to the course since the study was completed. A more detailed account of the conclusions and recommendations can be found in the report of the study (Kay and Prosser, 1983). Among the many positive aspects of the course were the following:

1. The quality of the lecturing was commented on favourably on several occasions.
2. The assignments in the course were divided into Pass and Honours sections with the Pass section being compulsory and the Honours section

being voluntary. This division was also commented on favourably on several occasions.

3. The fact that the course was structured so that students were able to write programmes early in the course was seen as a positive aspect.
4. The tutors felt they were well informed and were involved in many of the major decisions about the course.
5. The tutors and the students felt that the goals of the course were well defined and clear.
6. On the basis of the practical examinations and the Pass section of the end of course examination it was felt that basic programming skills had been developed by the students.

On the other hand, there were a number of issues which were causing some concern. Among these were the following:

1. Students who had learnt some programming before the course performed better than those who had had no previous programming experience.
2. There seemed to be some concern about heavy student workloads early in term, which appear to have had some effect on the high drop out rate.
3. The group of students who had only 2 units of HSC maths were substantially over-represented in those who dropped out.
4. A number of tutorial and laboratory organisational problems in the first few weeks were identified.
5. Students seemed to spend a larger proportion of their non-contact study time working at the computer terminal than planned and expected.
6. There were some problems with the available computer resources.
7. Many weaker students felt discouraged at not completing the Honours sections of the course or spent too much time doing it. Women were less likely to attempt the Honours work, and those who did attempt it performed at a lower level than would be expected.
8. Students consistently experienced problems in developing algorithms for the solution of programming problems.

With these sorts of issues in mind, we made the following recommendations:

1. Improve the quantity of and efficiency with which students use the computing resources.
2. Develop, trial and monitor the success of a pre-programming skills course aimed at developing some appropriate problem solving skills.
3. Combine the tutorial and laboratory so that tutors come to know their students better.
4. Decrease the workload in the first few weeks.
5. Emphasise the development of problem solving skills in the first few weeks.
6. Help students review their study habits and in particular the proportion of time spent at the terminal after about five weeks.

In the event, we were able to effect some aspects of several of these recommendations this year.

1. Additional computing resources were purchased but they were insufficient to make a significant improvement to the students' programming environment. But they did provide more resources than would have otherwise been available.
2. The particular pre-programming approach we investigated is based on Karel, the Robot, (Pattis, 1981) a data-less Pascal-like language for introducing the concept of algorithm in the context of syntactic structures that are close to Pascal. A Computer Science 1 Orientation programme based on Karel was run before the 1984 term. The participants were

selected as being most likely to gain from such assistance and selection criteria were determined on the basis of the large scale surveys of the 1983 study. Evaluation of the effectiveness of the Orientation Programme and Karel continues.

3. In spite of considerable difficulty, the tutorial and laboratory sessions have been combined with the desired effect of a closer relationship between the students and a single tutor.
4. The practical workload was redistributed and the pressure of the first few weeks did drop.
5. A number of tutorials and practical work on problem solving were developed. A programme for tutors was run so that the approach being developed would be understood and appreciated by them.
6. There was a continuous emphasis on the importance of students preparing for practical work well away from the terminal, culminating in tutorial discussions and reflection later in the term.

OUTCOMES FOR THE SUBJECT MATTER SPECIALIST

Given a good background in Computer Science, no training in teaching and little experience, the prospect of teaching a first year Programming class with over 800 students enrolled, is just a little daunting. Co-ordinating the thirty tutors is also something of a challenge. Even after a couple of runs, one would like to be able to attend to a number of issues. The study's main outcomes for the subject specialist are in the following classes:

* independent external as well as internal assessment of several issues;
* support and expertise in the review process;
* identification of major sources of difficulty and the development of strategies to address at least some of them;
* personal development as a teacher.

Having an "outsider" from the Centre for Teaching and Learning made it possible to evaluate several important aspects of the course that could not have been easily done otherwise. In particular, independence was important in the interviews of students who had discontinued as was the case in the enrolling student interviews and time-spent survey. In all these, the students were informed that the Centre for Teaching and Learning staff were assessing the course, not them. This should have made the questions seem less threatening, and, hopefully, the answers more honest and direct. Similarly the tutor interviews benefited from being conducted by a person outside the department. That the interviewer was not a computing specialist, encouraged tutors to separate pure computing and teaching issues.

Members of the Computer Science Department have consistently evaluated their teaching methods and effectiveness. Not surprisingly, this has tended to focus more heavily on computing issues than those of teaching method. The review process reported here was more effective because the team included members who were not part of the department, were unable to concentrate on details of the subject matter and were not directly involved in the delivery of the course. Fellow computer specialists could well comment on the minutiae of the course and contribute much to details such as actual assignments, topics, course structure and the like. However, the problems of students who failed to develop suitable study skills were established by the work of the collaborative team by a process of interviews that would not have otherwise been initiated. In addition to the ideas and review-expertise provided, the

Curricular Specialist supplied very welcome manpower for the review especially during the time of the heaviest teaching load.

The particular approach taken in this evaluation was such that the process was very flexible: as we analysed the results of early stages, we refined and redefined later stages. This made the project much more interesting and the teaching team perceived it as more useful since we could adapt the evaluation as it seemed appropriate. Certainly we made initial plans for the form of the study but it was satisfying to have the resources, shared initiative and expertise necessary for a dynamic review procedure.

That the review team was multi-disciplinary and reasonably formal, lent credence to the methods and outcomes. This gave the computing specialist greater confidence in the identification of the major issues. It also helped convince others involved in effecting changes and in maintaining some aspects. Since one of the major problems we identified related to students' study skills, it was invaluable to have the assistance of a curricular specialist to assess this and to help devise strategies to improve this aspect of the teaching.

For the computing specialist, a primary motivation for the review was to learn more about how to teach this class. Of course, "teach" includes the design of the curriculum at general and detailed levels, management of the course and delivery of material. The review provided much needed analysis of fundamental problems that many students experience and it helped to document many details in need of attention. It also helped other members of the teaching team participate directly in evaluation of the course. Although the actual delivery of lectures is just a small part of the teaching of the course, it feels like a very significant part of the course to the lecturer. The review included videotaping of several lectures, with most emphasis on the delivery but with some segments that showed the class. This made it possible for the lecturer to watch the lectures, warts and all. The lecture sequence also showed the effects of attempts to change the delivery.

OUTCOMES FOR THE CURRICULAR SPECIALIST

A number of issues faced the curricular specialist in the early stages of the review. Among these were some doubts concerning the usefulness of an activity involving "outsiders" and some concern about the validity and reliability of qualitative as distinct from quantitative information. There was also a view that the review needed to make some summative judgements about the course, and in particular might need to collect some comparative data.

With this background in mind, what sorts of things has the curricular specialist learnt, on reflection, from the review?

The review was established with many of the characteristics of the teacher as research model proposed by Stenhouse (1975) and more recently advanced by Kemmis (1983). From the viewpoint of the curricular specialist, an important part of the success of the model in this project was the use of a responsive approach to the review (Stake, 1975). Because the design of the review was not pre-ordinate, it was possible to develop the review process one step at a time. An example of the benefit of this process was that a small amount of information was collected early in the review including both qualitative and quantitative information, and from deliberations on this information the usefulness of a mixture of qualitative and quantitative information was accepted. Another example was that some of the more sceptical members of the teaching team could be informed of the sort of information we were collecting and were able to see some possible benefits of the review even in its early stages. Finally the responsive approach encouraged other members of the department to comment on the information as it was collected which facilitated the increasing acceptance of the formative aspects of the review. This review has strongly emphasised the usefulness of a responsive approach to formative curricular evaluation.

From the curricular specialist's viewpoint, though, this process of continuously analysing, summarising, distributing and seeking responses to the information collected during the review can be quite time consuming. Nevertheless, it is vital that in the early stages of the review a collaborative climate be established. The resulting time consumed paid off in terms of the acceptance of the conclusions of the review and the increased curricular knowledge and skills of the staff involved. It has also shown that once such a relationship has been developed, academic staff can react with interest and enthusiasm.

DISCUSSION AND CONCLUSIONS

In the introduction to this paper we stated that the major aims for the study were to gain an understanding of the major sources of difficulties for students and the effects of some of the teaching innovations.

As far as the major sources of difficulty were concerned, we are satisfied that we have identified many of them, as was indicated in the section on the Outcomes of the Course. Many of these difficulties can be traced back to the issues raised in the introduction. For example the problem of the varying background of the students was evident in the fact that students who had learnt some programming previously performed better than those with no previous programming experience, and those students with only 2 units of maths tended to be over-represented in the dropouts. As well many of the students who dropped out were among those taking the course as an introduction to computing rather than as a first course in a degree programme in computing. There also seemed to be substantial study skills problems in terms of the students' ability to use their free study time appropriately.

In terms of the effects of some of the teaching innovations, our major finding was probably the relatively poorer performance of women in the Honours material of the course. The Pass/Honours material was introduced for the first time in the year of the study, and it was hoped that this would help cater for both the diverse background of the students and their aims for the course. In general this seems to have worked reasonably well. But on examination of the performance of women we found that they were relatively less likely to attempt the Honours materials and having attempted, not to have achieved as well as the men who attempted that material. This was after controlling for the HSC aggregate and performance in the Pass material of the course. This was a somewhat unexpected and we believe important finding. This is an issue which we are hoping to follow up in more detail with the help of a CTEC Evaluative Studies Sub-Committee grant.

There are a number of other issues that emerged from the study which relate to those matters raised in the introduction, but those that we have discussed should be enough to show that this study as it was planned adn executed was able to deal with the issues planned to be dealt with in a reasonably satisfactory way. The study has also shown that co-operative deliberative studies between curricular and subject matter specialists focusing on the issues of importance to the subject matter specialist can result in findings which are acted upon and recommendations which are implemented in tertiary courses.

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AN INTERESTING BIAS ON EVALUATION

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Students entering tertiary courses and individual subjects or units do so for a variety of reasons. Anecdotal evidence consistently supports the notion that compulsory or service courses present more difficulties for academic staff than those courses which students are undertaking for interest and enrichment. Feldman's (1977) extensive literature review of course evaluations found a consistent relationship between subject interest and student ratings of instruction. Marsh and Cooper have demonstrated that although prior subject interest is "more highly related to student ratings than any of the other background variables considered ... prior subject interest is a variable that impacts on the quality of the educational process and is not an influence or bias that is specific to student ratings" (1981, p.102).

This paper presents results from the evaluation of courses and teaching by students, analysed with reference to the reasons why the students entered the course. Results indicate varying perceptions of several aspects of the course which can be traced back to reasons for enrolling in the course. Course teaching becomes more straightforward and the teaching better regarded when students are more interested.

The general results of this investigation may be what one may reasonably expect, and are consistent with the findings reported by Granzin and Painter (1973), Feldman (1977), Howard and Schmeck (1979), Marsh (1980), Marsh and Cooper (1981), and Barke, Tollefson and Tracy (1983). The fact that motivational aspects of student learning are frequently overlooked in evaluations indicates a need for those interpreting evaluation data to be aware of underlying interrelationships.

INTRODUCTION

In investigating factors influencing the study methods of Australian tertiary students, Watkins reported that "being interested influenced both qualitative and quantitative aspects of studying: that is, the students commented that when they were interested in a course they were more likely to adopt a deep level approach and study harder" (1981, p. 5). This supports the contention of Cronbach and Snow as it relates to instructional preferences of students: "Conceivably, a mode of instruction a learner is more comfortable with is one to which he can and will respond well. Hence one might expect self-selection among materials, work schedule, etc., to be beneficial" (1977, p. 170).

Watkins went further by explaining that "many of the respondents indicated that the lecturers'/tutors' enthusiasm and teaching ability were major determinants of their interest level" (1981, p. 5). This is certainly bound to be true in many instances, as is the converse that bad teaching may stifle initial interest. This interpretation implies that the level of interest in the subject is the result of the teaching, particularly when students may have entered a course because of the anticipated compatibility with the instructional methods employed. Such a preference may be difficult to entertain in practice, and an alternative interpretation of interest levels and instruction may have some value.

If there is some relationship between the interest in a subject and the teaching of it, perhaps the interest level on entry is influencing students' perceptions of the course and its teaching. Any causal relationship may be difficult to identify, for if both the quality and quantity of study are involved, as Watkins suggests, there could well be some indirect mediator responsible for both effects.

The purpose of this study was not to attempt to identify all the key factors operating in this aspect of tertiary courses, but to try to identify an approach to the topic which could be fruitful for practising evaluators. Although the evaluations were sought from students only at the end of the courses, this presents no methodological difficulties. Howard and Schmeck (1979) introduced a procedure to compare reported student motivation prior to and after the completion of a course. Despite slight changes that will occur, their findings supported the use of responses collected at the end of courses as a valid measure of motivation to enter a course.

A number of different courses were evaluated to establish some guidelines for interpreting student opinions about courses and teaching. Of those investigated, three are reported here. One large class and two small classes were selected as they represent different questionnaire approaches and analytical strategies. None of the courses was a compulsory one as some element of choice is an obvious requirement for selection. No first-year courses were included as students would have little experience at that level on which to make informed judgements about the courses they wish to enter. Subsequent analysis showed that information available to students in the form of descriptions in the Counter Faculty Handbook had no influence on course selection.

1. Accountancy

A third-year course with two hundred and fifty-two students was investigated, with questions on its structure, content, lectures and tutorials analysed and cross-tabulated. Only the interrelationships which were statistically significant on chi square analysis (<0.05) are reported here.

The most important question for this discussion was that on the reasons for selecting the course. As this course is required as a subject for membership of the Australian Society of Accountants, most students (72.1%) gave this professional requirement as their reason for undertaking the course. A further group of students (14.4%) needed to undertake this course as a prerequisite for later study. The remainder (13.5%) gave interest as their reason for selecting the course.

Crosstabulations of these three groupings with all other items was undertaken to determine where significant interrelationships might lie. Results indicated that several general features of the course structure were related to the reason for doing the course, as also were several elements of the lectures and tutorial classes.

Students undertaking the course out of interest rated the relevance of the material and the planned progression through the course more highly than did other students. These 'interest' students also rated the lecturer's delivery more highly, and had more confidence in their tutorial work and their relationships with other students. Of greater importance to this discussion, however, was the finding that these students spent significantly more time on coursework outside of formal class time, spending 4.3 hours on average compared with 3.5 hours for the other students. These 'interest' students also rated their own ability on the course more highly than did the other students.

To pursue the interrelationships further, crosstabulations were also carried out on the factors relating to the time spent on coursework and the students' rating of their own ability on the course. The significant relationships found here confirmed that those students who put more time into the coursework and regarded their own ability more highly perceived the course to be more relevant to their needs, the lectures to be clearer and well presented, and the tutorial atmosphere and discussion more productive. Those students finding that the time and effort put into the course paid dividends were, in the main, those students more interested in doing the course.

What one is able to make of the above information may not present anything that is surprising or has not been felt intuitively or reported anecdotally. What is of interest is that the motivation on selecting and entering the course may influence the student's perception of the course structure and instructional methods, and seems to be possibly reflected in both the quantity and quality of their work.

2. Sociology

To follow through the possible relationships indicated above, a small second-year undergraduate class was investigated. The thirty students in this course were invited to give several reasons for selecting the course if more than one applied, and to comment on various aspects of the course. The smaller number of respondents necessitated a different handling of the data, as statistical significance was more difficult to achieve. In fact the strongest relationship found was that the students who entered the course for interest did find that the course was more interesting!

The investigation in this course was undertaken by placing the students into three groups: those who selected the course out of interest (10 students); those who selected it for other reasons (12 students); and those who selected it for interest and another reason (8 students).

The other reasons given were that the course was recommended by students (but was not in the Counter Faculty Handbook), from the course description in the Faculty Handbook, because it suited timetabling considerations, or because it was the only subject available in this area of study.

Analysis of the students' responses showed that the three groupings gave perceptions that were more favourable with the interested students, and less favourable when interest was not a selection factor. In a qualitative manner with the many written responses, the graduation from interest only through both reasons to other reasons was reflected in perceptions of course structure, lecturing and tutoring. Good lecture delivery, clear explanations, staff giving good direction to students and having better rapport with students were typical of the perceptions of the more interested students. Those selecting for other reasons complained of lack of variety in methods, the pace being too fast, the reading too difficult and tutorials more impersonal and less helpful.

3. Law

Selecting this small course of nineteen students in a postgraduate course allowed even more detailed study of this interest phenomenon of selection. The considerable amount of comment written about the course as a whole and the four staff members who presented it was analysed with respect to the reasons for selecting the course.

Only four of the nineteen students indicated that they had enrolled for the course out of interest. It is obviously inappropriate to generalise from four cases, but the comments these four students made were supportive of the statistical findings in the accountancy class. Whether it is indicative of their enthusiasm in undertaking this course or not, these four students made more comments than the other students, and their comments were more constructively critical than other comments although none of them encountered specific difficulties with the course.

The main area of concern with the four interested students was one of workload, coping with the mass of material available to them. They would have liked the opportunity to do more work within the area and were disappointed that they could not deal with more. Selection of materials and direction within the course was seen to be adequate by these four students, but others had difficulty with coherence and the time necessary to cover the content.

Teaching methods were seen to be most appropriate by the four interested students, with good interaction contributing greatly to a demanding but enjoyable course. Other students listed a range of frustrations about teaching methods, indicating concern at both personal and general levels that seemed to become almost intimidating at times.

Investigation of responses was also undertaken on bases other than interest on selecting the course. Part-time versus full-time study, sex of students, age, grading on examination results and area of subject specialisation showed no difference in the perceptions of students.

CONCLUSION

This review of three courses was undertaken to examine the possibility that the reason for students selecting a course of study could influence their perceptions of the course. There is evidence that can be gained through both quantitative and non-quantitative methods of analysis to investigate the contention that interest in the area of study could be an important factor in course evaluation.

It is tempting to generalise from the tentative findings reported here that show some relationship between interest in the course and structural and instructional factors. Compulsory courses and service courses may not allow for any choice at all, but it must also be remembered that many students in tertiary courses are not undertaking their first choice of course and may not be at the institution of their first choice. Interest, enthusiasm or motivation could well be influencing consumer reaction to courses in ways of which we are not yet fully aware.

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CHAPTER 8

PREPARING FOR A POST-INDUSTRIAL SOCIETY

This final chapter begins with the paper from the Australian Bank Employees Union. As the writer notes, dialogue between higher education and the unions has been fostered by neither side, so this contribution to the conference is welcomed. With didactic passion the paper makes the point that it is workers who suffer from technological change, and that they should be protected from its consequences by having the right to retraining and reskilling or to further general education if they are too old for re-deployment or re-employment. These are issues of social justice, it says, and we as educators can help by raising these issues, and it suggests that more specific ways in which tertiary institutions can co-operate in retraining or further education would be by changing rigid entry qualifications and developing evening and distance courses.

The final paper serves as a corollary to the previous paper and as a summary of the general issues raised by the conference theme. Smith argues persuasively that we need to plan in all three tertiary sectors for recurrent education for what will eventually be a post-industrial society.

A UNION PERSPECTIVE ON THE SOCIAL IMPLICATIONS OF TECHNOLOGICAL CHANGE AND WORKER RIGHTS

Australian Bank Employees Union,
Presented by L. Hingley,
Federal Secretary

INTRODUCTION

In contemporary Australian society the so-called 'micro electronic revolution' is a frequent topic of conversation and often heated debate. It is little surprise that the topic raises such passion given the fact that rapid technological change touches all Australians in positive and negative ways. This paper enters the debate with an opinion which is unequivocally on the side of the worker and the unemployed. The main thrust of our argument may be simply put:

1. The Australian Bank Employees Union demands that employers consult Unions with respect to all proposed new technology at the planning and during the installation stages.
2. The Union demands the right to veto proposed changes deemed disadvantageous to employees - job security, skills, and health and safety issues form the framework for Union assessment of proposed changes.
3. Workers whose skills are threatened by the introduction of new technology must be offered the opportunity for retraining and this should be in employers' time at employers' cost.

In a nutshell, we argue that if the technological revolution is to make claim to being 'progressive', it must involve a more equable distribution of its benefits throughout society than has been the case to date.

The benefits of increased productivity and efficiency, rendered by much of contemporary technological change, must accrue to workers as well as to shareholders and executives, or, owners and controllers. Sharing the benefits of technological change must involve adequate training of workers whose skills are to be threatened. Working hours must be reduced and workers offered the opportunity to pursue education, if necessary in a recurrent fashion. Upon entering the workforce a person's access to further education should be encouraged by government, employers and education/training institutions.

ROLE OF EDUCATORS

As a backdrop to this paper it is perhaps worth briefly stating the importance the A.B.E.U. places upon the exchange of ideas and information between unionists and educators. This exchange and the actions of both groups is exemplified by the role many academics and unionists have played in raising the level of community debate concerned with the issues of technological change and employment. Educators at all levels have played an important role in debunking the myth of the 'dole bludger'. We now find a more sober analysis of the systemic causes of unemployment. As a consequence, blame for unemployment is slowly being removed from a focus upon supposed individual idiosyncrasies, and directed instead toward the role played by government policy, corporations and companies in creating unemployment.

Similarly we recognise the importance of tertiary institutions in raising many issues related to the form and course technological change takes. In particular, academics play an important role in supporting the argument advanced by unions for more consultation over the introduction of new technology and adequate retraining and educational opportunities for workers.

People involved with higher education must appreciate the role of post-school institutions such as Technical and Further Education (TAFE), Council for Adult Education (Victoria), Workers' Education Association (S.A., W.A. and N.S.W.) both for worker retraining and for a more fulfilling use of leisure time. TAFE clearly has the role of retraining while the W.E.A. and C.A.E. are important for the less formal pursuit of education. Post-school institutions such as these will continue to play an important intermediary role in the education system, particularly as workers begin to win the right to retraining, shorter working weeks and earlier retirement.

Due to the fact that many university students enter positions of authority in business and government at some time subsequent to the completion of their degrees, we believe it is critical that educators introduce all students to issues of social justice. Without doubt the nature of technological change and its impact upon society is a major social issue which embraces problems of social justice. Quite clearly, from a worker and Union perspective, a grave injustice is perpetrated when the workers lose skills and are threatened with retrenchment. The benefits must be shared equally, and this will involve shorter working hours and a more open access education system.

SKILLS AND WORKERS' RIGHTS TO CONTINUING EDUCATION

Industrial awards are largely determined by workers' struggles for what they perceive represents a fair deal. The many variations within awards are based upon technical skills and administrative skills. These variations are determined by workers' perceptions of the money value of their skills, and employers' preparedness to meet workers' demands.

As a consequence of rapid technological change, many technical skills are made obsolete, often in a comparatively short space of time vis a vis the history of deskilling since the industrial revolution. Of course many new skills are created, but the issue unions generally address is how to help those whose skills are rendered obsolete. One of the big problems for unions concerns how to convince and pressure employers to recognise the right of the 'deskilled' worker to adequate reskilling/retraining. It also involves employers recognising the right of the worker to adequate redundancy payments should he or she decide not to pursue a course of retraining.

In the banking industry the traditional skills associated with branch banking are being rapidly eroded. Branch managers and accountants no longer have the decision-making power they once had, due to the greater centralisation of decision making. The process of centralisation cannot be understood unless one appreciates the role played by the highly skilled 'technocrats' of the computer departments in banks. It is not uncommon to hear of the administrative management bemoaning the fact that so many of their decisions must pass through the hands of the "technocrats". Automatic Teller Machines and Point of Sales Terminals, both the heart of contemporary Electronic Funds Transfer, have certainly increased service efficiency, but this is at the expense of job skills and traditional career path.

We are not "Neo-Luddites" but we do demand greater consultation, retraining and "preskilling" for our members. The point we wish to make to conference participants concerns the role they may play as educators and curriculum designers, in both raising issues of technological change in the community and in seeking the establishment of new courses which confront issues of technological change from a less technocratic point of view - in essence, a point of view that respects the problems workers face in the workplace.

Tertiary educators must seriously consider tailoring their courses to accommodate those deskilled workers who are fortunate enough to have the opportunity of retraining in a university or college. Such tailoring involves recognition of the different backgrounds of the worker vis a vis the student with little or no work experience. Universities and colleges are often alienating and intimidating places for people who have spent many years in the workplace. Courses may have to be restructured to accommodate the problems workers confront when commencing study. Here again, the union movement through the ACTU may play a positive role in working with tertiary institutions to identify problem areas and their rectification. College and university counselling services are obviously important, and need adequate staff to cope with the problems of retraining workers and encouraging their participation in higher education.

Universities and colleges must change many of the old and increasingly outdated practices of demanding formal school qualifications for entry. "Mature-age" entry schemes, such as those operating in a number of Australian Universities should be expanded, not cut back as has been the recent trend. Part-time study should be encouraged by educators being more prepared to teach in the evening - and of course, be accordingly remunerated for evening work! Off campus courses such as those available through Deakin University must be encouraged.

There is clearly a role also to be played by TAFE and WEA in offering courses on a wide range of topics for workers whose skills are made obsolete by technological change. The critical point for workers concerns access to courses and information about their very existence, but problems of access are more often than not an employer problem rather than an institutional one. As we argued in our introduction, employers must allow workers paid time-off to attend courses during the day. Unions believe that such an arrangement is far more satisfactory than that of expecting workers to attend courses after work. Notwithstanding this, institutions such as TAFE must continue to encourage workers to attend evening courses.

Much of our argument rests also upon the position that reskilling/retraining is an issue determined by an individual worker. That is, the sort of education a worker seeks need not necessarily be either related to the industry he/she is employed in, or directed toward the acquisition of technical skills. A worker must have the right to determine, free from employer pressure, the type of reskilling-reeducation he/she desires. In many cases we believe workers want to broaden their knowledge outside the narrow areas in which they work. One important way of sharing the benefits of technological change involves a national programme and new forms of educational institutions which encourage workers to pursue "a whole of life" continuing education.

Following from the above we maintain that employers must, with respect to deskilled workers:

1. Support workers in the re-acquisition of technical skills including paid time-off to attend courses;
2. give guarantees to workers that on the completion of a course, employment which utilises the newly acquired skills will be promptly found;
3. offer adequate redundancy to workers who seek to leave their place of employment;
4. support workers who wish to study courses not specifically related to their employment including paid time-off to attend courses.

The first point refers to a concept of "preskilling". This involves unions demanding pre-training programmes well in advance of implementation. Workers must be given the opportunity to reach required levels of competence prior to the introduction of new technology into the workplace. This is particularly relevant to older workers whose skills are threatened (i.e. workers in their mid 30's to 50 years of age.) For these workers adapting to new work patterns is often a slow process, filled with stress and anxiety. Only well designed courses will facilitate the transition to new skills.

We also support the efforts of the employer in designing "in house" retraining courses. As with other issues affecting our members, we seek the opportunity, where possible, to have some input into the design of such retraining schemes.

There is a real need for significant consciousness raising among managers, executives and directors concerning a worker's right to adequate preskilling and access to recurrent education. The flow of information from the board rooms and upper echelons of management could be improved considerably. Keeping workers "in the dark" about proposed changes to word processors and equipment must end. We support the position of the ACTU delegation to the National Technology Conference, where it was made clear that, unless consultation takes place over the questions associated with technological change in the contemplative and planning stages, then it is totally unrealistic to expect the co-operation of the trade union movement.

The fourth point attempts to come to grips with the problem that many jobs are simply low skilled and essentially boring. One of the aspects of technological change is its propensity to eliminate many low skilled jobs, and create only a few highly skilled ones. Consequently many workers, if they are not made redundant, are offered a job with the employer which is less skilled and often less rewarding than the previous one. In such cases, we argue that a worker has the right to choose an education programme which compensates for the loss of skill and general degradation of working conditions. This, of course, applies particularly when it is clear to workers and unions that little may be done with respect to retraining. Thus, in compensation, the worker may attend at employer expense a course of study not necessarily related to his/her current form of employment. This point simply adds another dimension to unions' call for fewer working hours and more participatory democracy in the workplace as a just means of sharing the benefits of technological change.

We cannot state too strongly that one of the most important dimensions of sharing the benefits of technolgical change involves employer acceptance of a worker's right to paid recurrent education. Paid time off to attend courses is an important way workers may continue their education throughout their working life. The aim of a more highly educated population has been a traditional goal of the democratic state. Through the enormous productivity improvements offered by technological change the potential exists for an "education boom". Such a "boom" is only possible if the benefits of technological change are shared more equally.

Although unions are bitterly opposed to the emergence of a new ideology which seeks to justify "permanent unemployment", we nevertheless recognise that the problem will remain for some time. In light of this we maintain educators must begin to think seriously about means by which the unemployed may have greater access to various post-secondary institutions. Of course, education in itself will not offer the "good life" if it is not followed by real job opportunities. The growth of unemployment and under-employment is both a denial of the right to work, which unions defend as a basic human right, and an extremely destructive social phenomenon. Academics and educators must speak out against the creeping disease of unemployment. They must use their influence and their skills in pressuring governments and employers to confront the problem more seriously than has been the case in recent years.

CONCLUSION

The ABEU maintains that the scope of retraining must be broadened to include provision for workers pursuing education, training etc. which is not necessarily specifically related to their employer's interest. Both retraining and the pursuit of educational interests must be paid for by the employer, and in employer's time. Most importantly, consultation must take place prior to the introduction of new technology. Consultation beginning at the contemplative stage allows workers and their unions the opportunity to comprehend the new skills they may need in order to remain either employable or in an interesting job. It also allows unions the opportunity to assess the possible retraining programmes the employer should implement, and to inform workers of such programmes. Educators must play a role in pressuring univeristies and colleges to implement more innovative entry requirement systems and hours of teaching.

Courses which study the nature and future of work must be encouraged since they demand considerable research. Society is going to need much more information about the prospect of work and the nature of work in years to come.

Clearly the challenges which educators and unionists confront are profound. These challenges are more adequately met through the encouragement of more dialogue between unions and those involved with higher education. Such dialogue has not tradiationlly been fostered. As a consequence the ABEU believes that the opportunity afforded us to make a contribution to the conference is welcomed and hopefully the sign of a change.

THE POTENTIAL FOR A LEARNING SOCIETY

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There are many social issues forcing themselves on the public consciousness which confirm that recurrent education is an idea which can no longer be ignored. As a concept it has received consideration internationally for little more than a decade, and then only among educationists and certain social reformers. However industry both at worker and management levels, governments concerned with unemployment, and economists aware of the imminence of the post-industrial society, have for some years been putting forward proposals that are all part of the concept of recurrent education.

The trend is so apparent that the next step may well be to create public awareness of the total concept, and to detail the provisions already available and the possibilities which could be implemented in a learning society.

When recurrent education becomes a universal practice we shall indeed be living in a learning society. In a small way our communities are turning towards a learning society, but people's attitudes will have to be re-oriented to the idea of lifelong learning. It has long been taken for granted that people go to school in the first two decades of their life, and then to work for the next forty or fifty years.

Their choice of subjects at school was crucial, for the job they hoped to have for the rest of their life - laborer, clerk, tradesman, professional - depended on the choice of studies and the level reached at school. Only the rare and persistent souls undertook further learning once they had been working for a few years. But today these rare souls are becoming commonplace; people are going back to learning at all ages and for a multiplicity of reasons. This is certainly recurrent education in practice, although as yet for only a small percentage of the population. In a learning society everyone may choose to return to learning a dozen or more times during the course of their life.

Lifelong learning was first discussed as a universal possibility in the 1960s. An historical convergence of ideas and events may have been responsible for this. The Declaration of Human Rights, promulgated shortly after World War II, followed by two decades of unprecedentd prosperity among the majority of people in western countries, combined to create an interest in the individual, in every individual, that has seen no parallel in history. Oneself, the individual, became the subject of intense study. Personal fulfilment was the goal.

In addition to the personal interest in self, many groups and individuals were working for selfhood for all people. In 1972, the UNESCO Report, Learning To Be, under the chairmanship of Edgar Faure, talked of each person's right to realise his/her own potential; and lifelong education was the way that individuals could fulfil themselves.

But other social forces were impinging on the optimistic years of the late sixties and early seventies. For the Western world the most dramatic changes were based on technology. We now know that we are leaving the industrial era behind and entering the post industrial era with the continuing development of computer based technology that virtually eliminates the labour-intensive, industrial era techniques. The pattern of work is undergoing a structural change. A smaller number of workers, most requiring highly-specialised skills, can increase production in every area.

As the different industries start to experience this we hear the first calls for new educational programmes. From management the calls are for courses that will upgrade the skills of the workforce; there are not enough people with the right skills, is the cry. From unions and other worker bodies the desire is to spread among their members the decreasing number of work hours available, and so schemes such as paid educational leave are eagerly espoused. Whereas such ideas were first mooted during the more affluent 1960s, based on the concept of the individual's right to fulfilment, the need to reconcile the computer age with the numbers of people offering themselves for work has added an urgency to the educational leave proposals.

Shorter working hours and increased leisure time are obvious long-term outcomes. In the short term however we have had ten years of high unemployment, with hundreds of thousands of people displaced or unable to enter the workforce.

For the institution of education the inescapable conclusion is that everyone will have to go back to learning at some time in their lives - for occupational or personal reasons - for work or leisure.

This implies an increased role for the three major systems that educate Australian adults —Technical and Further Education (TAFE), the Colleges of Advanced Education (CAEs), and universities. What can these three systems offer; and what changes could be made to them to hasten a learning society?

TAFE is the system that offers the greatest scope to most of the population. Most TAFE students are over the age of 20; in New South Wales about 44% of TAFE students are aged between 15 and 20. TAFE has traditionally offered a wide range of trade-based certificate and diploma courses, and increasingly it runs specific short courses, especially for updating skills as new technologies change work styles in different industries.

Between 1982 and 1983 there was a drop of 42% in new enrolments for trade courses, and it is being accepted that one area of change for TAFE will be that of trade training through traditional apprenticeships. There are many problems associated with this area which will have to be worked out before much longer between TAFE and outside industrial and government agencies.

Most of the changes ahead for TAFE are organisational, both administrative and curricular. If we are to cope successfully with the post-industrial era we shall need to look to new work, new employment concepts, and different lifestyles. In all of these areas new learning will be required, and TAFE will be the system where everyone can turn for help.

Flexibility is the key word, a word that sits oddly with the bureaucratic nature of our education systems. Yet there are three flexible features in TAFE which already work to its advantage, and which can be developed further for future change. The three features are its short courses; its part-time teachers; and its Outreach Project.

Already most of TAFE's students are enrolled in short courses. The growth of short courses will continue with the continued need for flexibility, for example as the changing structure of industry requires it. TAFE will need the administrative capacity plus access to Labour Market Surveys, to mount new courses, to phase out courses, and to implement rolling reform of trade courses. This will be required as skills areas in many industries, such as the printing industry, are wiped out by new technological applications, and in others where the old skills are being replaced by new. This is where the practice of employing part-time teachers will assist. At the moment TAFE has about 2 part-time teachers for every 1 full-time, and the mechanisms for calling upon teachers at short notice will be further refined as the course changes continue.

The lead-time to the setting-up of such new courses will need to be weeks rather than the leisurely year and a half which has become the custom in some educational establishments. A good example of this sort of flexibility is to be found in TAFE's Outreach Project. New courses can be mounted in a matter of days/weeks to suit client demand, and may be run as a once-off course or re-run over several semesters. Outreach courses can start and finish at any time of the year, not even being bound by the semester framework. As such arrangements become more widespread, accountability will be an issue to be faced.

While it is necessary to recognise TAFE's continuing function to offer initial training programmes, and to see that traditional craft skills do not die out, the trade and other skilled areas including preparatory programmes will see the greatest changes for TAFE. As for their Further Education function in the personal fulfilment area, TAFE, in common with the other post-compulsory systems, is still only dimly aware of the vast growth area ahead.

For CAEs and universities the learning society is becoming a reality as we watch. The days of campuses filled with 18 to 20 year-olds are numbered. By the early 1980s more than 40% of university students were aged 23 or over, and more than 50% of CAE students were 23 years or over. Between 1976 and 1981 the numbers of students entering university straight from school declined by more than 18%.

Since ours is ceasing to be a youthful society, since the numbers of older people are increasing relatively, these trends will probably continue. If older students' needs are to be catered for, universities and CAEs will have to make changes to courses - both structures and content, administrative structures, and staffing.

Reskilling and updating courses are becoming a necessary part of our lives, and will be an increasing function of universities and CAEs. Course structures and course content will change. Instead of programming, and hoping that adults will adjust to what is offered, we shall have to adjust our programmes to the needs of the students. Many students will increasingly want access to tertiary education on the basis of short courses, possibly built up on self-contained semester or year-long units, rather than on two or three-year pre-ordained programmes as required for today's diplomas and degrees.

Now that the age barrier is being broken at universities and CAEs, many older students are seeking to study for personal and cultural reasons that have little or nothing to do with updating or reskilling for vocational needs. The same scientific-technological developments that lead to older people seeking new, or newer skills are also leading to shorter working weeks, years, and lives. Older people will seek recurrent education to fill, and to learn for, their leisure time. Again, short courses, and self-contained units that can be built on, are likely to be popular among such students.

Flexibility will also be important at universities and CAEs. Special administrative departments may need to be set up as changed and enlarged versions of today's continuing and adult education units, to mount new courses, and to recruit staff from across faculty boundaries for specific programmes.

New staffing arrangements will include programme planners, entrepreneurs who will uncover demand for courses and write new course designs. Increasingly, universities and CAEs will use experts as visiting lecturers, people who are working in the field.

CAEs are well placed to provide more of these short cycle, specialist courses. In the universities there are already one or two units performing these functions, and they may very well be setting the pattern for change at university level.

The need for recurrent education, for lifelong learning, can be easily demonstrated. The demand for it is growing, but still only among a small percentage of our society. As all our agencies that offer learning adapt their offerings to demand, and as learning becomes more attractive to larger numbers, there is every prospect that ours will become a learning society.

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